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THE IRON AGE

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MAY 16, 1940

ESTABLISHED 1855

Vol. 145, No. 20

Economics in Reverse

If all goods and services were free to every one who worked and if everybody worked, there would be no need for wages. For the purpose of wages, or any other form of income, is to enable the possessor of it to buy goods and services or to store up the power to buy them.

This is the simple reasoning upon which the dreams of socialism, communism and technocracy have been built.

The logic of this reasoning is sound and solid. You cannot upset it. But the dreams which have been built upon it have utterly failed because they stuck to logic and neglected human nature.

In accomplishing things in this world today, as always, a knowledge of human nature is more important than a knowledge of logic or mathematics.

This may be why engineers, as a rule, are not found in the top executive seats of industry. There are exceptions, of course, plenty of them. "Gene" Grace and "Ben" Fairless, both of them engineers, have done pretty well as top executives. But by and large an engineer can do better with his slip-stick than he could with a sceptre.

In college, they ought to teach us engineers something about human nature. It's the most important coefficient in the success formula.

When I went to school I was taught that two and two make four and I believed it. Since that time I have learned that they sometimes make five and more often three.

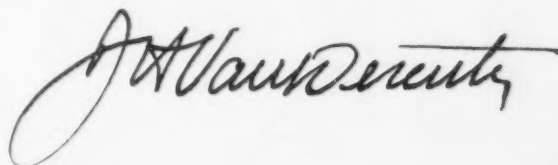
I was taught that a straight line is the shortest distance between two points. Experience has taught me that in most cases, the quickest way to get to where you want to go is to take a circuitous route.

The adage, "waste not, want not," was dinned into my ears as a youth. Yet today I find saving condemned as anti-social and spending and borrowing and more spending praised as virtues.

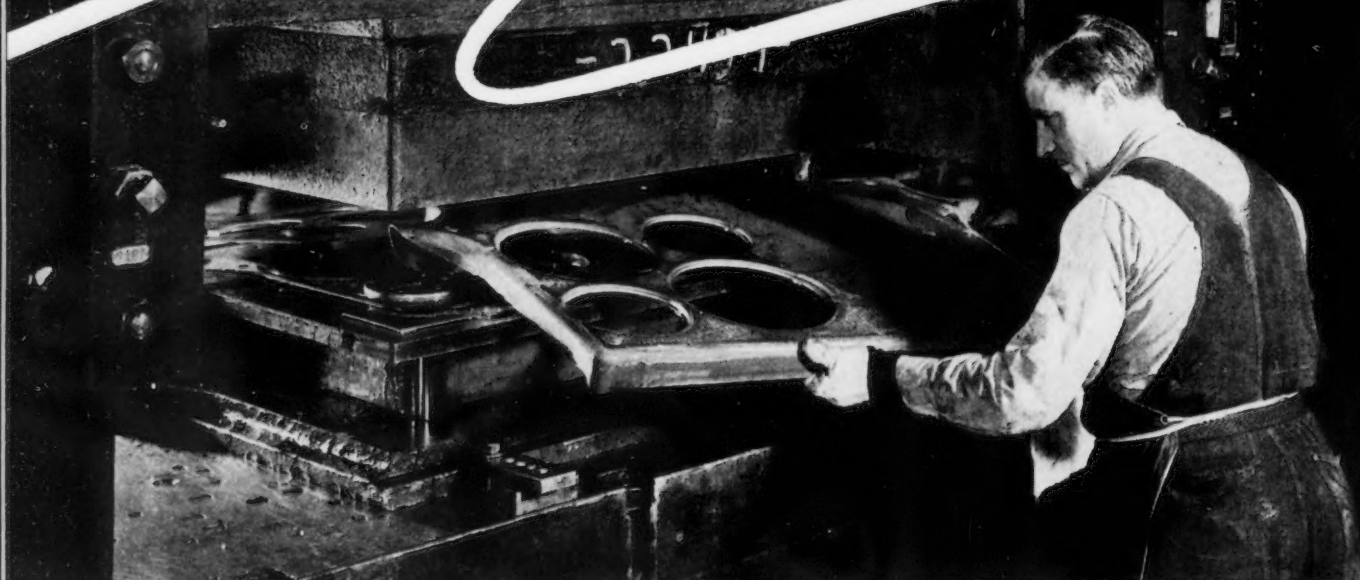
In my early days I learned to recite the little poem which contains the lines: "How doth the busy little bee improve each shining hour." So I took it for granted that we must put as much achievement into each hour as possible. Now I learn that in this country with 10 million unemployed we are producing too many goods for too many people. And that we should reduce productivity, shorten hours and slow down improvement.

I still have some faith in the old slogan "As good as gold." But sometimes, in thinking of the 65 per cent of the world's gold that is buried under Fort Knox, I wonder about that too.

Some bright young New Dealer could do us old-fashioned fellows a favor. Just write a text book of economic principles in reverse. Put all of the reasoning backside foremost and upside down. Then we could tell what to prepare for next.



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Welds and the Testing of their endurance

By JOHN H. HRUSKA
Head, Metallurgical Department,
Electro-Motive Corp.
(Subsidiary General Motors Corp.)
La Grange, Ill.

IN the present state of engineering knowledge relative to stress conditions in various structures, machines, and means of transportation, the static requirements are generally well known and easily ascertained by conventional tests. Dynamic properties such as the resistance to impact and repeated vibratory movement have been acknowledged as of vital importance, but the results of metallurgical tests so far are nothing but criteria which do not enable the designing engineer to really calculate from reports offered by the various laboratories. These conditions have been explored by many investigators without success for many ferrous and non-ferrous materials of admitted commercial uniformity. If there are more than two materials to be considered in testing simultaneously, these evaluations become still more perplexing.

Metallurgical tests with welds of various kinds present the most acute problem in the technique of contemporary testing. The static tests were well standardized by the American Welding Society, the American Bureau of Shipping, United States Navy, and other technical bodies. Fatigue or endurance has been frequently the subject of rather exhaustive research but standardization has admittedly not been attempted because of the inconsistency of results obtained.

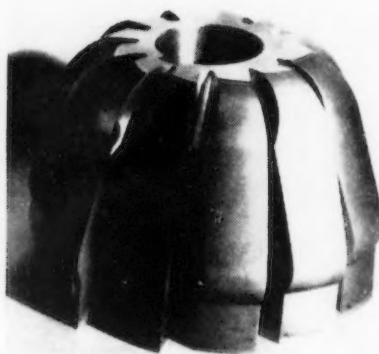
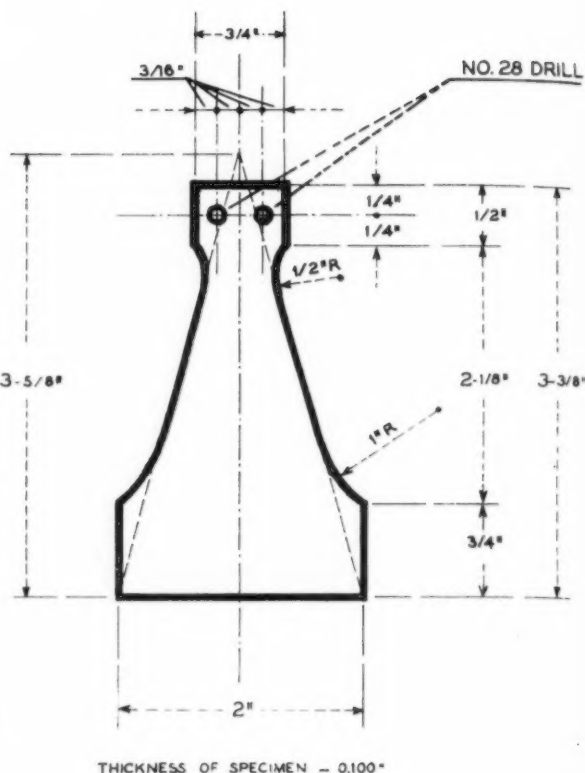
FATIGUE or endurance tests of welds are most important, but their standardization has been most difficult because of inconsistencies of results. The

author herein presents a testing method believed to be considerably superior to previously used procedures—uniform testing and duplicable interpolation is possible.

While the following report of the writer's work may be considered as adding to the complexity of the problem, this report is presented in good faith that some of the objections to previously used procedures have been minimized if not eliminated altogether. In addition, the adopted sequence as well as the details of procedure have been corrected so as to make at least *uniform testing and duplicable interpolation* possible. It should, nevertheless, be borne in mind that the work reported herein is of a distinct laboratory type dealing with samples produced under shop conditions. The hypothetically correct procedure of testing weld or other joints or even materials would naturally be to test individual pieces under service conditions. Since this is not possible, the logical approach is to simulate stress

conditions as they exist under ideal performance on the representative parts.

Perhaps the most outstanding factor in selecting proper methods, technique, and testing machines for evaluating fatigue properties of welds is the adoption of such geometrical shapes and finishes of the representative specimens by which the effect of stress concentrations is practically eliminated or at least unified thus rendering results of a definite comparative magnitude. This prime requirement has frequently been overlooked by investigators. The finishing or surface conditions especially have been responsible for a great deal of inconsistency in the results obtained. Microscopic inspection of the surface finish of many fatigue specimens secured from various endurance testing laboratories will certainly confirm this contention.



There is another point which is open to discussion. Thus, in very rare instances are welded portions of structures or parts actually of circular cross-section but most methods employ a circular specimen for testing fatigue. The stress distribution will naturally vary accordingly, and the standard specimens used presently in testing endurance are not representative. Most of the applications of welding are in a plate or sheet type or else they are combinations of flat members such as in fillet welds, various angles, shapes, etc. This fact brings up the question of whether or not the round test bar is of real significance. In comparing

laboratory tests with observations made on numerous structural members welded together with standard service stresses, it will be found that most conditions approach repeated flexure of flat instead of round members. This speculation prompted the author to adopt a modified flexure test such as used previously for the testing of sheets to the testing of weld characteristics. The details of the specimen, finish, and apparatus follow.

Apparatus and Procedure

Actual tests of endurance of welds may be conducted by using any specimens removed from test plates or

finished assembly, provided the specimens are larger than about $3\frac{1}{2} \times 2\frac{1}{4}$ in. The writer prefers, of course, larger pieces which permit a simultaneous test of weld, thermally affected zone, and parent metal. A typical sketch of one of these test plates is given in Fig. 1. In general, six specimens of each portion tested are desirable. The thickness of the tested material should be over 0.1 in. for reasons which shall be set forth later. At times it may be imperative to check fatigue in both the longitudinal and transverse directions. The small test pieces may be obtained by cutting or even shearing, provided ample allowance has been made for the finishing of the test specimen. A general outline of the test specimen at time of test is specified in Fig. 2.

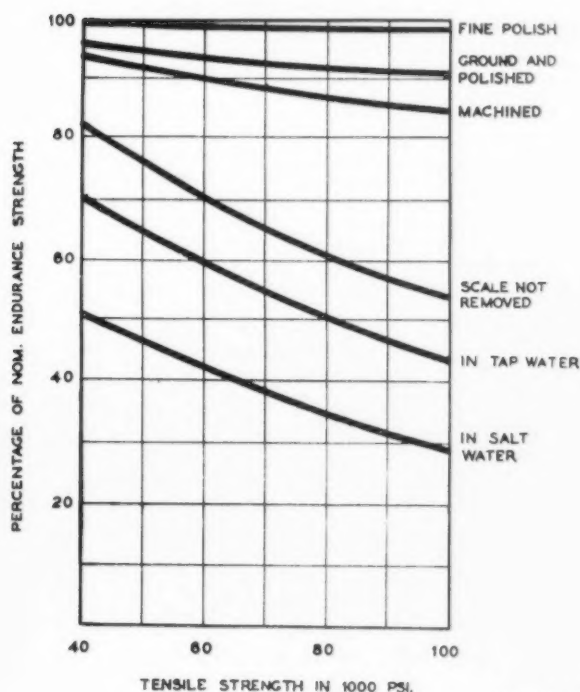
A special profile cutter made from first grade high-speed steel (shown in Fig. 3) and formed precisely to dimensional outline of Fig. 2, insures a desirable accuracy to within 0.001 in. This cutter eliminates stress-raisers and cold work on the edges of the specimens by cross-milling a large number of $3\frac{3}{4} \times 2$ -in. blanks clamped together on the table of the milling machine. The high initial cost of the cutter is, however, a remunerative investment if testing is to be done more or less continuously.

Next to a uniform contour of the test specimen, the surface of the latter ranks in importance. The well known observations of several investigators relative to a marked decrease of endurance strength with certain surface conditions (See Fig. 4) have been duly considered in finishing the specimens. Uniformity of a truly comparative finish has been attained by grinding each on a surface grinder with a standardized grade of wheel. The specimens are held by means of a magnetic plate and are finished to a thickness of 0.100 in. (plus or minus 0.0005 in.). The edges are touched up by hand polishing. The surface is

When fracture of the specimen occurs, the rotary motion of the eccentric virtually hits the stop to the right of the eccentric (See Fig. 6) which stop automatically turns off the switch of the motor. If the welds are to be tested under corrosive conditions, the vise may be substituted by a U-shaped adaptor and the entire end immersed in the desired solution.

The method of determining the bending stresses in a specimen of the type described is based on obtaining load deflection characteristics for representative samples from each series of the tested welds. The simple apparatus shown in Fig. 7 and used by

the author consists of an exact copy of the vise of the testing machine. The cantilever end of the specimen is equipped with an attachment very similar to the loading bearing of the tester. A circular indentation on top of this bearing permits point loading by means of a set of calibrated weights added to a pan below the apparatus bench. A round cross bar of the attachment in the plane of loading permits duplicate measurements of deflection with dial indicators. An Olsen extensometer of 2 in. measured length may serve as a check on the stresses caused by the applied load increments. The deflections are selected so as to



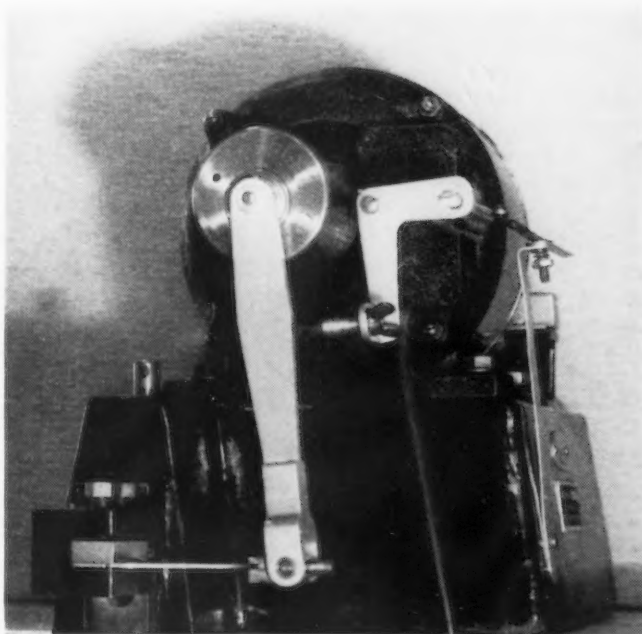
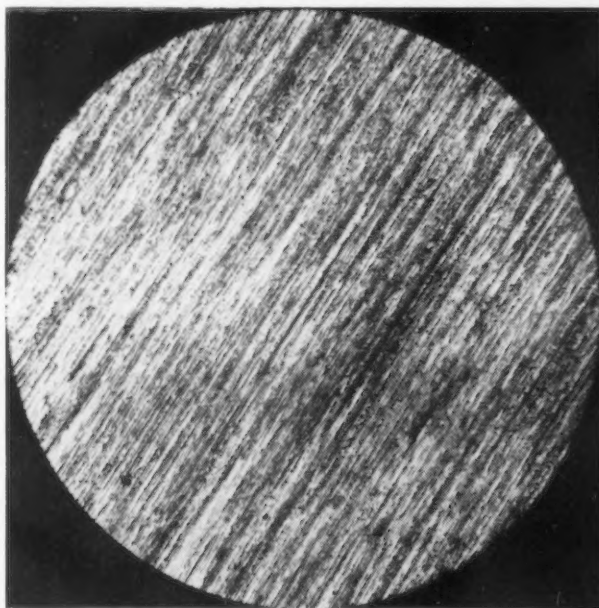
UPPER LEFT
FIG. 4 — Reduction of endurance strength due to surface conditions. (A. V. Karpov).

UPPER RIGHT
FIG. 5 — Surface finish of fatigue specimens at 50 magnifications.

AT RIGHT
FIG. 6 — One of the Krouse fatigue testing machines used in the investigation.

shown in Fig. 5 at 50 magnification.

The specimen thus prepared is then inserted into the vise of a constant deflection type reversed bending machine, care being taken that the specimen butts up against the rear stop of the vise. The other movable end of the specimen is then clamped into the loading bearing, which in turn is activated by the bar of the variable throw crank or eccentric. The throw may be set to any desired deflection of the cantilever beam. One type of testing machine is shown in Fig. 6. The machine operates at 1750 reversals a minute and requires a 1/3 hp. motor. A counter located at the rear of the testing machine records in 1000 r.p.m. to a capacity of 100,000,000 cycles.



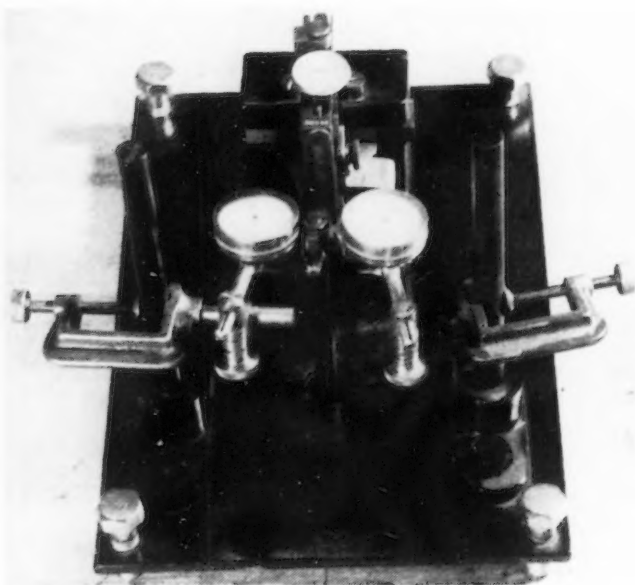
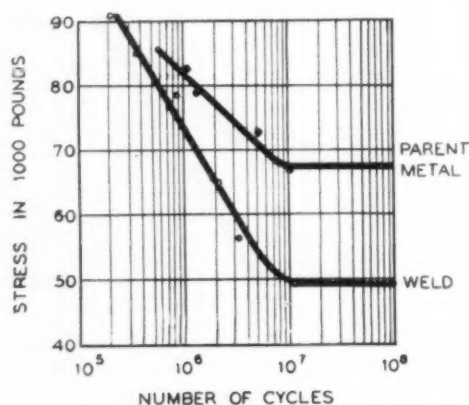


FIG. 7—Load-deflection apparatus for testing fatigue specimens.



AT LEFT
FIG. 9—S-N diagram for 18-8 stainless steel in the "as received" (parent metal) and welded (weld) condition.

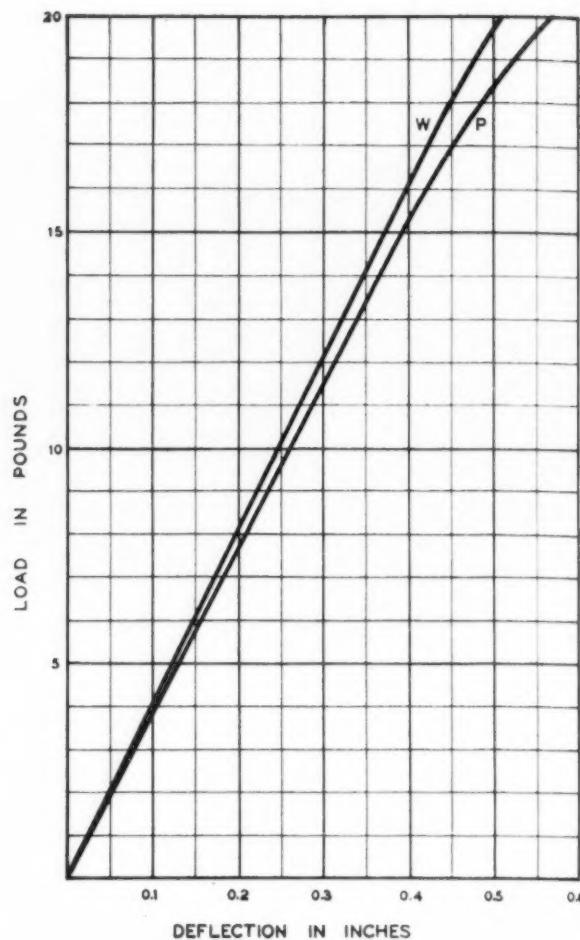


FIG. 8—Load-deflection curves for parent metal ("P") and weld ("W") of type 18-8 stainless steel fatigue specimens.

approach the values or settings of the eccentric in the testing machine. Generally they vary from 0.05 to 0.50 in. The actual data for the calculations are obtained by proper interpolation from the complete load deflection curves.

An example of such a curve is presented in Fig. 8. It is perhaps worth noting that the described procedure is somewhat more flexible and more accurate than the application of dead weights at the axis of the connecting pin and simultaneous reading of the deflection as indicated by the pointer attached to the specimen bearing of the testing machine.

From the figures thus obtained, the static bending stresses may be computed by substituting in the following well known formulae for a cantilever beam:

$$S = \frac{M}{I} \cdot C$$

$$I = \frac{b \cdot t^3}{12}$$

$$S = \frac{12P}{t^2}$$

In these formulae the following substitutions are to be made:

S = Stress in outer fiber, lb. per sq. in.

M = Bending moment on critical section in in.-lb.

C = Distance from neutral axis to fibers in in. (ordinarily $t/2$).

I = Moment of inertia of cross-section in in.⁴

P = Load applied in lb.

t = Thickness of the specimen in in.

b = Width of specimen in in. at desired distance from point of load application. (The distance of load application is ordinarily equal to 2 in.)

For routine determinations, the formula does not require any further corrections.

In an actual case an automatically welded 18-8 stainless steel sheet (280 amp., 29 volt, 60 in. per min.) was used in preparing 0.052 in. thick specimens. The characteristics of the material are given in Table I. By using the formula and from dimensions of

TABLE I
Characteristics of 18-8 Stainless Steel Used for Endurance Tests
Chemical Composition

Carbon	0.10 per cent
Manganese	0.47 per cent
Silicon	0.51 per cent
Chrome	17.89 per cent
Nickel	8.94 per cent

Physical Properties

Tensile strength	169,950 lb. per sq. in.
Yield point	156,970 lb. per sq. in.
Elongation in 2 in.	21.8 per cent
Reduction of area	48.4 per cent
Rockwell hardness	B-110

the specimen, it is found that the width at 2 in. from the tip as well as the bending moment at 2 in. gives the following relationship:

$$S = \frac{12P}{(1.104)0.052^3} = 4027P$$

At the point selected, the stress and load deflection characteristics are shown in Table II. These figures may then conveniently be presented in diagrammatic form together with the customary stresses used for such welds. S-N endurance diagrams of frequently made welds and adopted materials of various industries are of decided advantage to the engineering departments in visualizing expected resistance to various dynamic stresses.

The work carried out so far offered very interesting conclusions. Specimens prepared in accordance with the foregoing description were tested to destruction. Fatigue failure occurred in the vast majority of cases outside of weld. As a confirmation of this statement Fig. 10 is offered in evidence, showing on the left the specimen removed from a 4¼ in. plate of ordinary automatically welded carbon steel. The plate was the same as

TABLE II
Load-Deflection Characteristics of Welded
18-8 Stainless Fatigue Specimens

Deflec- tion, in In.	Parent Metal Stress, in		Welded Section Stress, in	
	Load, in Lb.	Lb. Per Sq. In.	Load, in Lb.	Lb. Per Sq. In.
0.05	1.8	7,250	2.0	8,050
0.10	3.8	15,300	4.1	16,510
0.15	5.7	22,950	6.1	24,560
0.20	7.6	30,600	8.1	32,620
0.25	9.5	38,260	10.1	40,670
0.30	11.3	45,500	12.1	48,730
0.35	13.3	53,560	14.1	56,780
0.40	15.2	61,210	16.1	64,830
0.45	16.8	67,540	18.0	72,490
0.50	18.3	73,690	19.6	78,930
0.55	19.6	78,930	21.1	84,970
0.60	20.6	82,960	22.4	90,200

shown in Fig. 11. Careful examination of this photograph will show that the crack occurred between the two welds and that it started in the parent metal and not in the weld. The specimen on the right in Fig. 10 depicts a manual weld of manganese-molybdenum steel plate after 10,000,000

cycles at a setting of the eccentric of 0.20 in. No failure nor any incipient cracks were noted. Both specimens were etched rather lightly after the test.

Conclusions

The generally accepted theory of weld failures due to simple gravitational or static forces has often led to erroneous conclusions in regard to expectations of many welded joints and structural elements. Consequently testing procedures intended as aids in evaluating materials or methods of welding should certainly simulate circumstances under which they are expected to operate. It is well known, especially in the technology of modern transportation, that most failures and anticipated difficulty are the results of dynamic forces. This fact should obviously increase the interest of metallurgists and designing engineers to some uniform and yet flexible procedure of testing resistance of materials and welds to repeated flexures. It is hoped that this report will be of some small benefit to those attempting simplified methods to check the endurance resistance of such materials.

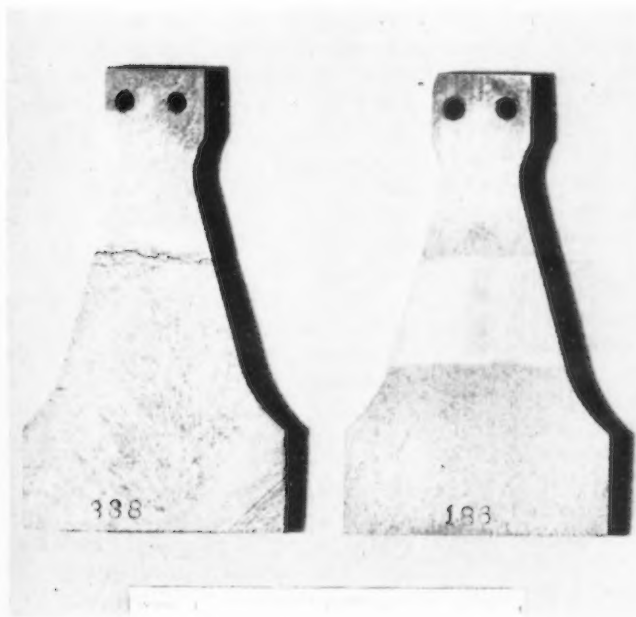
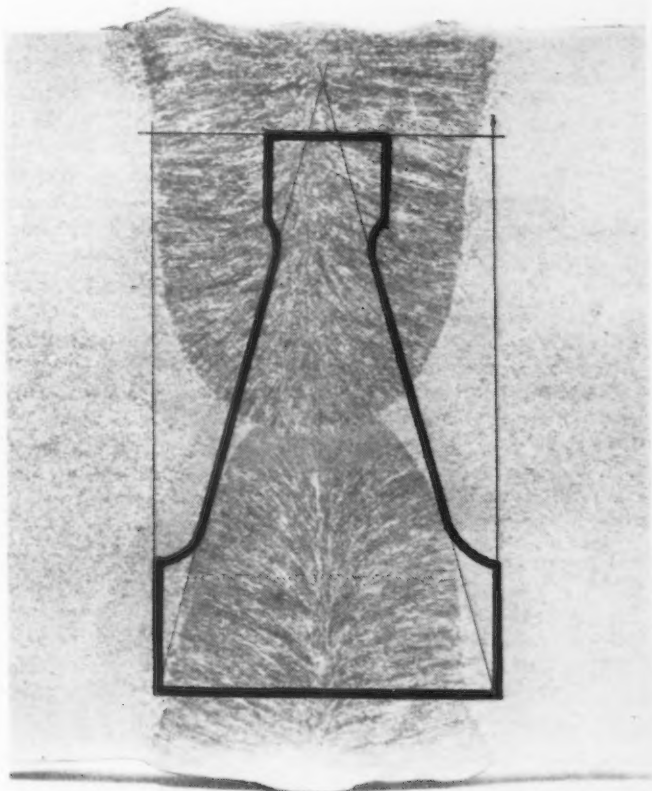


FIG. 10—Two of the tested specimens.

• • •

AT RIGHT

FIG. 11—Method of removing fatigue specimens from welded cross-section.



DIES *of* CAST IRON

By RICHARD BREDENBECK
*Advance Die & Tool Co.,
Cleveland*

THERE has been, in the stamping and die manufacturing industries, an increasing recognition of the place which high tensile cast irons are achieving as a die material. Not so very long ago any die, draw or forming die, which was made of cast iron instead of tool steel, was considered to be an inferior product. This concept, however, is rapidly disappearing due chiefly to two important developments:

(1) The production and ready availability of high tensile irons with properties providing important economies in construction and good production life.

(2) The successful application of flame hardening to such irons, which has made it possible for the die designer to construct a tool much more economically than in original cases which required all working edges to be made out of tool steel sections in order to avoid warpage of the finished part by hardening.

It is both definitely possible and highly practical today to build high grade draw or forming dies in which

nothing else is used but a high tensile iron. For instance, GA Meehanite offers a minimum tensile strength of 50,000 lb. per sq. in. and a compressive strength of 175,000 lb. per sq. in. With heat treatment these properties increase so that tensile strength becomes greater than 70,000 lb. per sq. in. and compressive strength to about 250,000 lb. per sq. in., so providing ample properties for such applications. Of course, the design of the part to be drawn or formed is an important factor to be considered in planning such dies. For example, a rectangular pan on which the corner radii are not too small and the flanges which are to be drawn are long enough so that they will not scrape the die walls when drawn or formed is a production piece, the die for which may be successfully made from high tensile iron. Such a die will last just as long and actually give less trouble in production than if the die were built using water or oil hardening tool steels of the good grades, for which a die maker pays anywhere from 20c. to 40c. per lb. The same principles apply, of course, to any drawn round cup.

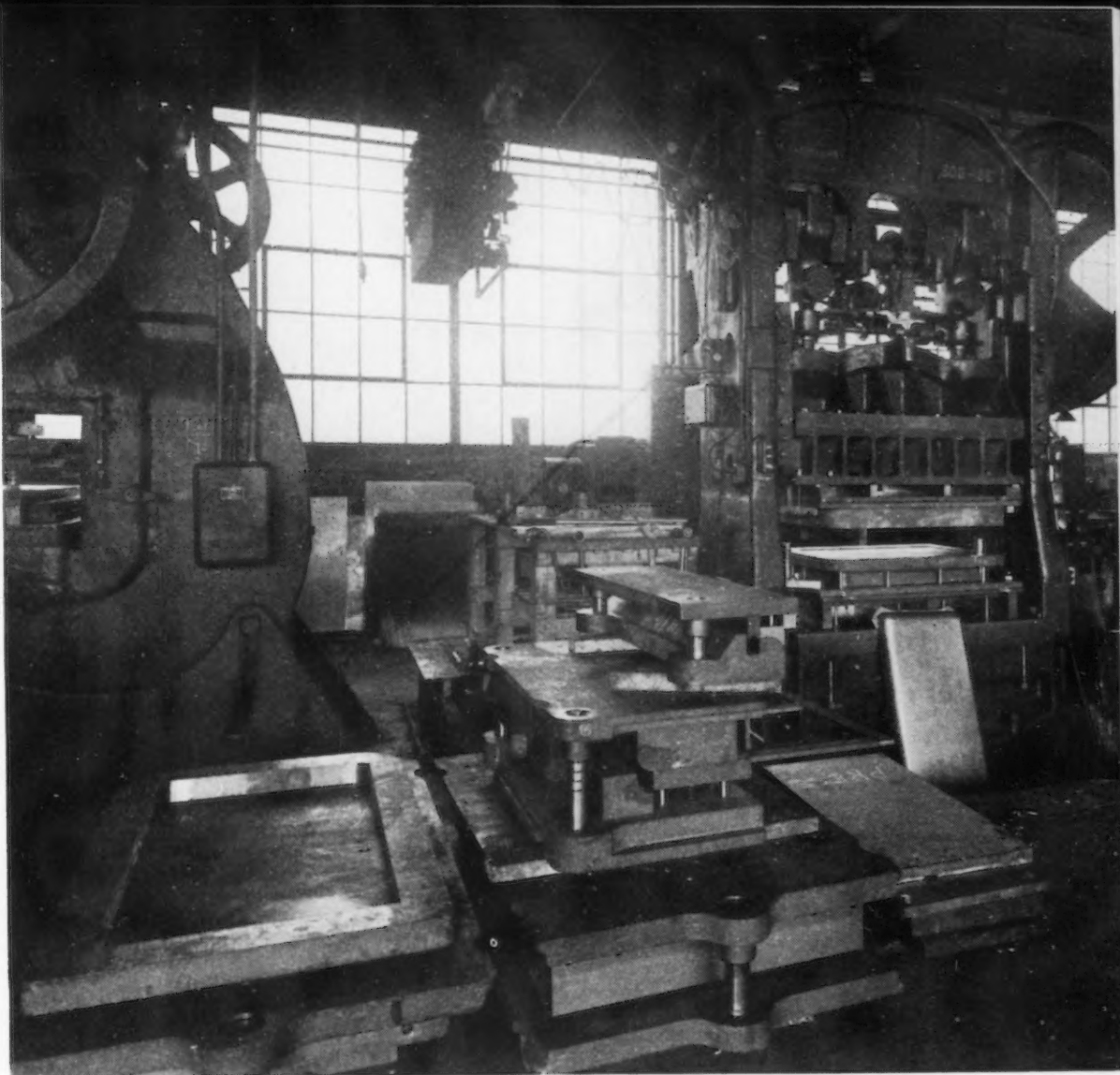
In the Advance shop it has been found to be a definite fact, after some years of experiment and experience, that a high tensile iron, when properly hardened, ground, and polished, prac-

tically eliminates "pick-up," one of the worst enemies of the die-maker. In fact, in 95 cases out of a hundred, a die so constructed will not gall at all. This is due to the fine dense structure of the metal plus the free graphite particles which are self-lubricating in action and are evenly distributed throughout, producing an extremely smooth, cold-worked surface on the draw radii and surface of the die. Naturally proper lubrication is essential.

The ability to flame harden high tensile irons successfully is a comparatively recent achievement and Meehanite cast iron has shown a very satisfactory adaptability to this treatment.* As an example, a large punch or die with all kinds of embossings and offsets can now be cast-to-form in one piece and this permits a satisfactory flexibility in design. After complete machining and finishing the working edges of such a die can be flame hardened and the result is a good tool for a moderate production rate on such parts as automobile gasoline tanks, refrigerator panels, stove parts, and washing machine parts. In Advance's experience these dies, when used for these purposes, will give a good year's production before re-working is necessary. A considerable saving both of time and expense is effected by eliminating the necessity of building up such a punch. The deformation in this hardening process is not enough to worry about and the very hard sur-

*See "Flame Hardening of Meehanite," by F. H. Bickford, *THE IRON AGE*, Jan. 11, 1940.

. . .
 A VIEW of the
 shop of the
 Advance Die
 & Tool Co., show-
 ing several die
 sizes and shapes.
 These dies are
 cast of high ten-
 sile iron.

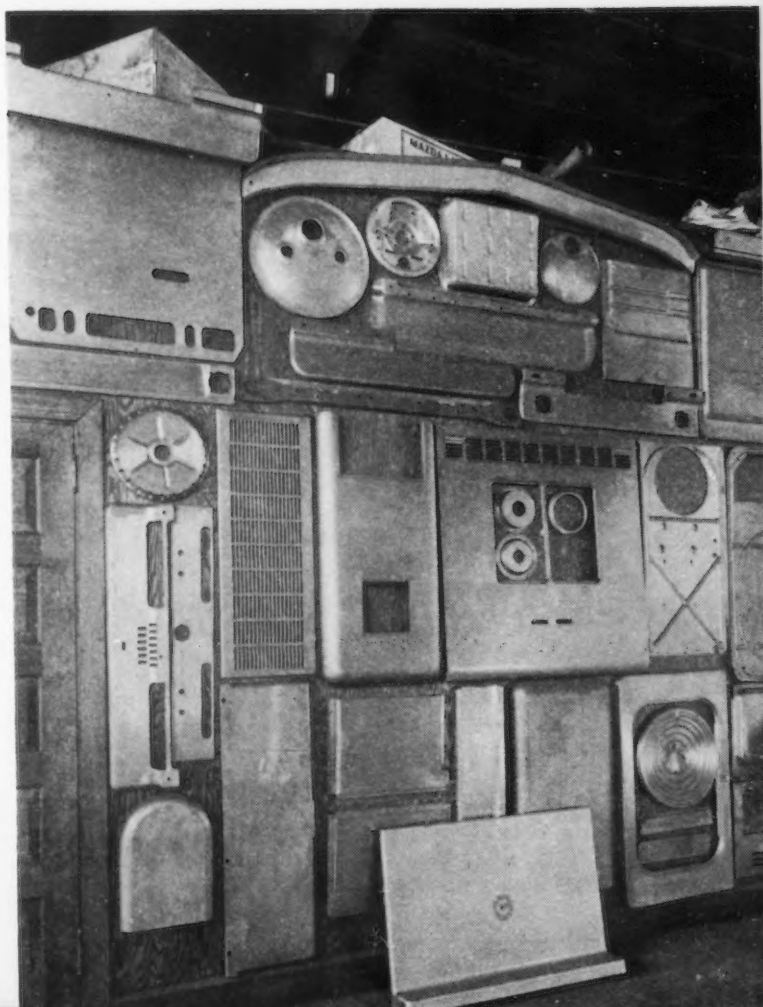


face produced by the flame hardening
 makes a good wearing edge for such
 a form or draw die.

As indicated previously, it is not ad-
 visable to use high tensile iron dies
 where there is a scraping effect of a
 blanked or sheared edge of a sheet in
 the operation of the tool. For exam-
 ple, if a forming die is made for a
 part with a very short flange of about
 $\frac{3}{16}$ in. or $\frac{1}{4}$ in. on steel heavier than
 20 gage, an iron die should not be used
 for a medium size production. The
 blanked or sheared edge of the sheet
 will constantly scrape off the die walls,
 and in this case nothing but an ex-
 tremely hard tool steel will give sat-
 isfactory results. This also applies to
 corners of a small radius in which a
 large amount of material is com-
 pressed in the process of drawing.

In the Advance Die & Tool shop
 experience has proved that there are
 quite enough substantial advantages to
 be gained by the extensive use of high
 tensile iron in the manufacture of
 metal stamping dies for any die maker
 to give it thorough and careful con-
 sideration.

. . .
 A DISPLAY of
 stampings
 showing the var-
 iety of types and
 designs which are
 made with dies
 manufactured in
 accordance with
 the methods de-
 scribed herein.



PRECISION BROACHING, STAMPING AND MILLING

Demanded in Scale Manufacture

THE remarkable progress made by an old industry in recent years is emphasized now that Toledo Scale Co. has collected its numerous principal operations into a single new plant at Toledo.

The company counts more new applications and more advances in design and engineering over the past 10 years than several previous decades combined were able to produce. Scales have become more accurate, easier to read, lighter yet stronger in construction, and greatly improved through automatic electric controls, cut-offs, and printing devices. And, certainly, a coordinated research program inaugu-

rated in 1929 has yielded big dividends at Toledo.

At the same time manufacturing skill has advanced steadily and this is notable because the making of a line of scales such as Toledo offers is no prosaic business. There are around 50,000 variations of basic retail, industrial and special scales. Parts lots run from one part to quantities of 60,000. There are different materials in a

variety of odd shapes to be contended with, making the business not nearly so cut and tried as many of the products weighed upon the finished scales. Particularly notable in improved manufacturing skill are advances in broaching, stamping, gaging and milling. There are many skilled hand operations as well as high speed automatic production. Accuracy and close tolerances are vital.

Toledo employs the cam and pendulum principle on most of its scales, although a few beam scales also are made. Plastic cases are provided on most models for retail use. Other major parts include the base, levers, platform; stainless steel rack and cast bronze alloy pinion; cylinder chart made of thin sheet aluminum; cam assembly of bronze; bearings and pivots of tool steel; sector guide, and pendulum weight. On one small scale a die cast aluminum base is used; on some of the counter scale models the base is of heat treated cast aluminum; on others cast iron. Fig. 1 shows the cast aluminum base and principal parts of a cylinder type Guardian retail model.

Typical of Toledo progress, this Guardian unit, with molded Plaskon exterior, weighs only 63 lb. against approximately 160 lb. for the comparable 1929 model. Part of the weight saving is due to the lighter case and part to elimination of a heavy counterweight. A light weight aluminum chart offers numerous advantages over the paper chart employed in 1929, par-

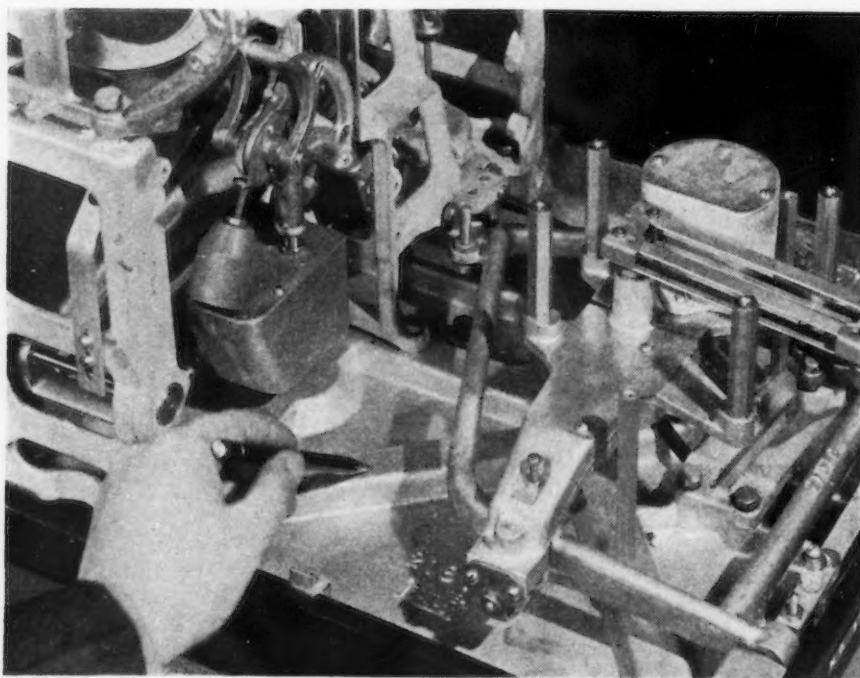


FIG. 1—Close-up view of base of "Guardian" retail model scale, showing pendulum, levers, cams and check link. Chart cylinder of thin sheet aluminum may be seen at top left.

ticularly overcoming errors of paralax. The new design, with inclosed weighing mechanism, incorporates such improvements as increased pivot distances and full floating type pendulum mechanism. The pendulum, instead of hanging from a knife edge, is suspended by steel ribbons.

One outstanding recent manufacturing accomplishment is the development of a method of grinding broaches which are used to cut a perfect V on bearings. Toledo makes liberal use of these bearings on which the knife edge pivots ride. For years strenuous efforts were made toward seeking a new method of putting a V on the bearing at one cut. Finally, development of special broaching fixtures and equipment solved the problem of getting the two angular sides smooth and with a definite radius at the bottom while at the same time keeping the radius absolutely tangent to the flat sides. In some instances it is necessary that the radius be as high as 0.125 in. and as low as 0.008 in. and in other cases the V must be absolutely sharp. The radius at the bottom and the flat surfaces of the sides of the V on the bearings must blend in smoothly together or the knife edge will jump and may hang up. Formerly these V's were ground in a manner which made it necessary to dress the radius on the grinding wheel by hand.

Broaching the knife edge on bar-lever pivots, which are of tool steel centerless ground to 0.0005 in. diameter, has been developed to a very accurate stage. After the ground stock is cut to length and chamfered in an automatic screw machine and the key slot milled, the pivot is placed in a spool, shown in Fig. 2, which holds, clamps and supports the part against the thrust exerted by the broaches. The slot of the pivot fits a key within the spool and a set screw and slots on the outside diameter of the spool prevent the part from moving. The broach feeds down producing one-half of the knife edge, then reverses. The operator tips the spool over and reclamps it and the other edge is then broached. The cutting action is from the knife edge downward. The pivot is checked and gaged while still in the spool by measuring from the knife edge across the back of the spool.

Check-link pivots used in the assemblies under the platters of several retail model scales present another intricate broaching job. This type of pivot is made from low carbon steel pierced and blanked on a punch press, then flattened and chamfered. Formerly a D-shaped hole was used to key the

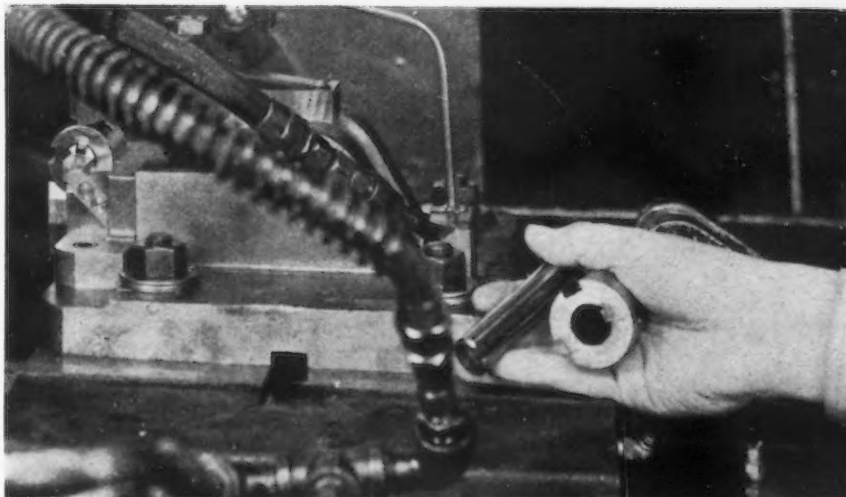


FIG. 2—Broaching a knife edge on pivots has been developed to a very accurate stage. Pivot is shown in fixture at left. The hand is holding a pivot blank and the spool which holds, clamps, and supports the part against the thrust exerted by the broaches.

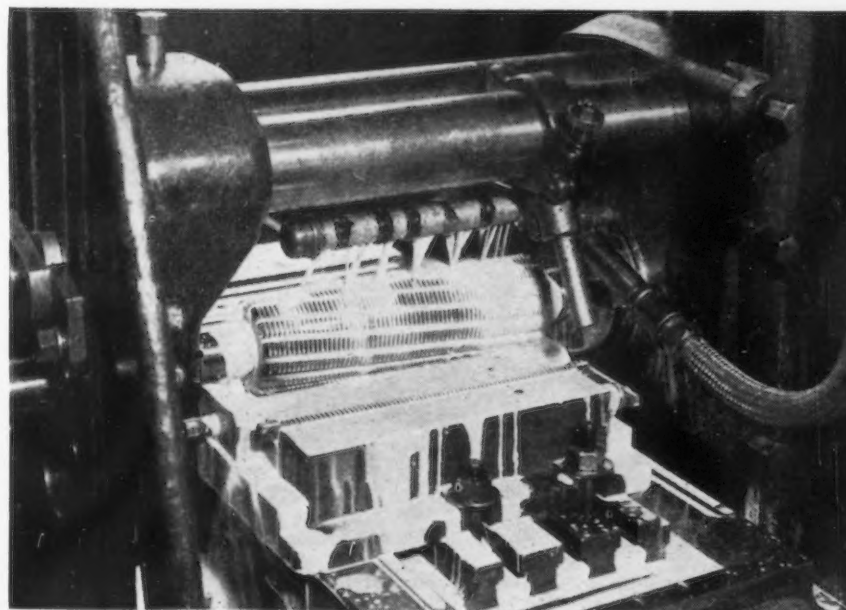


FIG. 3—A special type of milling cutter is used to produce the notches in the beam of the "Speedweigh" scale.



FIG. 4—Boring machine with heavy-capacity scale lever clamped in place.

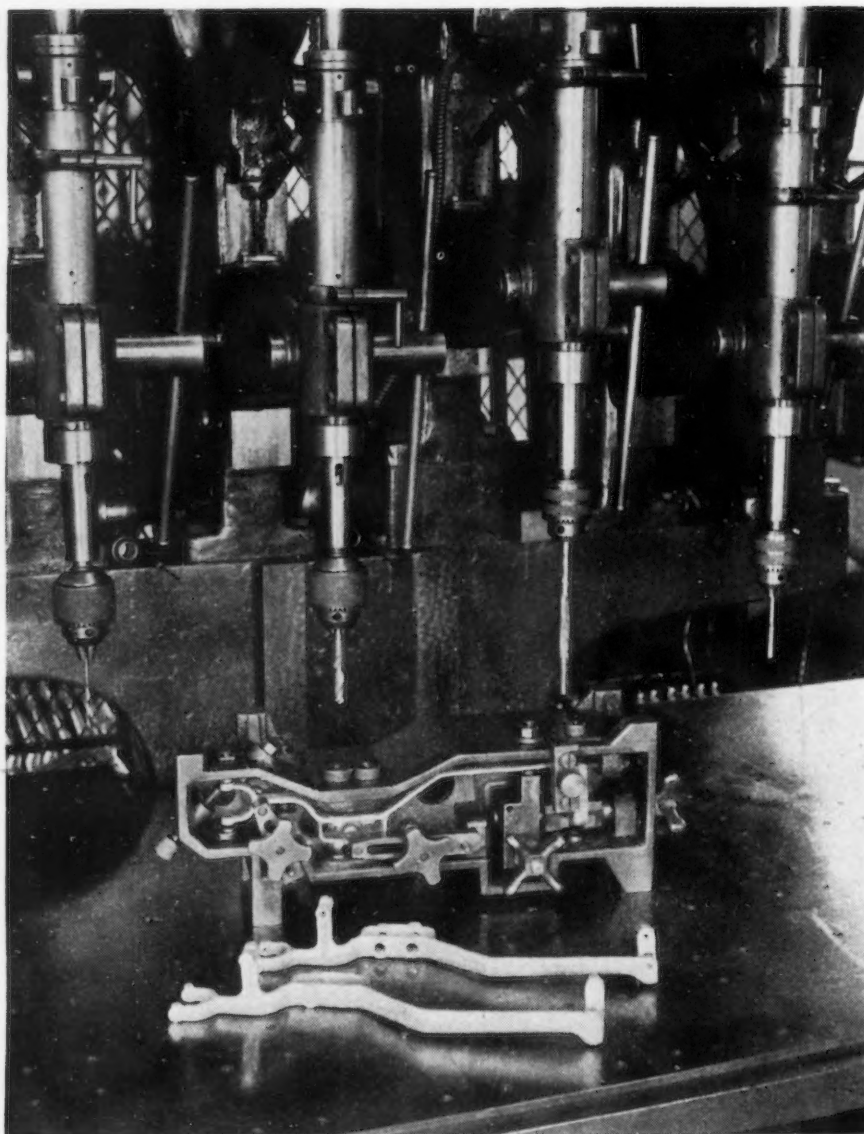


FIG. 5—The intricate shape of this pendulum operating lever makes for an interesting drilling operation. High accuracy is maintained.

pivot onto its shaft and prevent it from turning after assembly, but the new type hole with 16 serrations broached is more satisfactory. After the broaching operation, the knife edges are notched for grinding relief in a multiple milling fixture; the pivots are copper plated and the two ends milled to provide thrust points, before hardening. The serrated form on the stud end is produced by an external broaching die on a punch press. "Go" and "No Go" gages are used to check the serrated sections of both parts. Knife edges are ground in a specially designed machine with two "cup" grinding wheels dressed by diamonds. The entire pivot assembly is later cadmium plated.

To mill notches on the beam of the Speedweigh scale, a special type of

milling cutter is used, an interlocking, spiral, ground form-relieved-beam milling cutter. As shown in Fig. 3, the cutter is of the spiral type to reduce shock in milling and provide a shear cut. The teeth are accurately spaced within 0.002 in.; while the accumulated error for the entire length of the cutter is less than 0.005 in. These accuracy standards are maintained in all of the 896 teeth of the cutter.

Because of its 11½-in. length, this cutter was made in three sections, closely matched when assembled on the arbor. The spiral gashing of the cutter is uninterrupted over its entire length. The parts are rigidly clamped four at one time in each of the two fixtures, one at each end of the milling machine table. Two cuts, a rough and a finish, are made.

Fig. 4 shows a specially designed machine for boring holes in levers for heavy industrial scales. The holes are held to within 0.001 in. The fixture shown in the illustration will hold either the long lever or the short lever of the Model 8800 scale. Thrust pin holes are drilled and countersunk in the first operation. The thrust pins are then driven in, so that any distortion in the assembly has occurred before the pivot holes are put in. After assembly of the thrusts, the levers are loaded again into the same fixture for drilling and reaming the taper pivot holes. The cutting tools are driven and fed in by six individual boring heads, two operating at a time from opposite sides. The table is then moved to the next position. Specially designed reamers with a guide or pilot on each end are used.

Bar-steel extension levers and bench levers provide a good illustration of methods used in the production of specialized parts, used in limited quantities. Here the most important machining operation is the drilling and reaming of the pivot holes. A fixture flexible as to range has been developed by making one of the bushing plates or brackets flexible. This bracket is located in a T-slot which runs the length of the jig, and is held accurate to width and is lined on both sides with hardened and ground steel plates. For each different range a separate key is provided which fits into the T-slot.

Fig. 5 shows the intricate shape of the pendulum lever for the Guardian retail model, and also a special "tumble jig" developed for drilling the holes at one setting. The material used in this part is a high-strength aluminum alloy which is heat treated after casting. Drilling the pivot and fulcrum bearing holes requires care. The work must be accurate, and care must be taken that the part is not sprung during the process due to its peculiar shape.

The part rests on three rounded buttons and is clamped tightly by three additional crowned surfaces. A set of floating jaws is clamped on the fulcrum end of the lever for support against the pressure of drilling and reaming. The jig is moved from one spindle to another and tumbled so that the part can be drilled from several sides. The drill press has been equipped with a table made of hardened and ground tool steel blocks which produce a surface that is absolutely flat. Both jig and table are made in Toledo's tool room on its own design.

COST OF CUTTING WITH BUTANE, PROPANE AND ACETYLENE

—A Critical Discussion

By E. L. MATHY

First Vice-President, Victor Equipment
Co., San Francisco

o o o

THE recent article entitled "Cost of Cutting With Butane, Propane and Acetylene," which appeared in the Dec. 21, 1939, issue of THE IRON AGE, gave comparative fuel gas and oxygen consumptions and cutting costs when acetylene, butane or propane are employed in cutting various thicknesses of steel plate. Because the figures which were given by Messrs. W. T. Tiffin and O. R. Eads of the University of Oklahoma are quite confusing, an analysis of them might be in order.

Let it be understood that this writer neither produces nor is instrumental in the sale of either oxygen or any fuel gases suitable for torch cutting. In the interest of accurate information, however, data published in regard to the relative merit of usable fuel gases should be as reliable as this ever controversial subject allows them to be.

The test itself is said to have been made on steel plate of A.S.T.M. A-70 specification. The surface condition of these plates has not been mentioned and so they may be assumed to have been relatively clean. The composition of the butane and propane employed also is not available and therefore they may be assumed to have been of the usually available commercial products.

Analyzing Table II (Comparative Cutting Cost per Foot for Butane, Propane and Acetylene) as given in the article mentioned promptly suggests a number of questions.

How, for instance, did it occur that butane tip No. 1, when used to cut 3/16 and 3/4 in. plates, produced such an accurate gas consumption duplication? In each metal thickness the butane tip No. 1 consumed 1.05 cu. ft. of butane per hr. and 81.0 cu. ft. of oxygen per hr. It is the general experience that the amount of oxygen actually employed in the cutting operations rarely varies substantially no matter which usable fuel gas is employed, providing identical metals, tip sizes, and oxygen pressures are used. On this

general premise, it is difficult to understand why the No. 1 acetylene tip consumed 35.6 cu. ft. of oxygen per hr. and 9.98 cu. ft. of acetylene, while butane tip size No. 1 consumed 81.0 cu. ft. of oxygen and only 1.05 cu. ft. of butane per hr.

It can be pretty well assumed that 9.98 cu. ft. of acetylene are likely to have consumed from 10 to possibly 13 cu. ft. of oxygen. If 13 cu. ft. is deducted from the total oxygen consumption of 35.6 cu. ft., there is left for the actual cutting 22.6 cu. ft.

Cutting this 3/16-in. plate with butane should have involved approximately the same amount of actual cutting oxygen since both the acetylene and the butane cuts were executed at identical cutting speed, namely 144.5 linear ft. per hr. On that basis 1.05 cu. ft. of butane would have consumed 58.4 cu. ft. of torch oxygen and obviously something must have been radically wrong in the adjustment of the preheating flames or in the calculations pertaining to the gas consumption to have obtained 81.0 cu. ft.

The average experience with machine cutting of clean plates with the oxy-acetylene torch, resulting from thousands of tests, produces a machine cutting speed of from 120 to as high as 170 linear ft. per hr. and the average oxy-acetylene consumption for such a job is around 10 cu. ft. for the acetylene and around 75 cu. ft. for the oxygen.

Tip size No. 1, used by the testers, is given as having four preheating holes each of a size of 0.039 in. and a center diameter cutting orifice of 0.043 in. Apparently the same tip was used for both the acetylene and the butane fuel gas. Should this assumption be correct, it is certainly a poor selection as far as the butane tip is concerned.

Based on experience, the writer would have selected an acetylene cutting tip with four preheating holes, each of a drill size No. 73 and an oxygen jet of a drill size No. 58, and as a matter of fact, with machine cutting, there could easily have been taken an even smaller size tip. For use with butane the writer would have selected a properly recessed butane tip provided with eight preheating flame jets, each of a drill size No. 67 and with identical center high pressure oxygen orifice. On the basis of many tests, quite likely the consumption should have been in the neighborhood of 10 cu. ft. of acetylene and 75 cu. ft. of oxygen at the same cutting speed indicated in the article under discussion, and the butane tip probably would have consumed about 6 cu. ft. of butane per hr. and probably 77 cu. ft. of oxygen.

Table I appearing in the article shows the total amount of oxygen necessary for complete combustion but no reference is made to the fact that, no matter which fuel gas is used, only a portion of the total oxygen requirement is furnished by the torch and a substantial portion thereof by the surrounding atmosphere. The oxy-acetylene flame, for instance, if it were adjusted properly for maximum preheating speed and flame temperature would have been of a ratio of 1.3 to possibly 1.5 of oxygen per cu. ft. of acetylene. The remaining volume of oxygen needed for total combustion would have been supplied by the surrounding atmosphere. (For welding with neutral flames the ratio would most likely be 1.1 oxygen to 1.0 acetylene.)

A similar adjustment of the oxy-butane flame would probably have been 2.5 cu. ft. of torch oxygen per cu. ft. of butane and the additional 4 cu. ft. of oxygen would be supplied by the atmosphere. Average test results bear out these figures quite adequately.

Were space available, a lengthy treatise and possibly much interesting data
(CONCLUDED ON PAGE 108)

HYDRAULIC TORQUE CONVERTERS

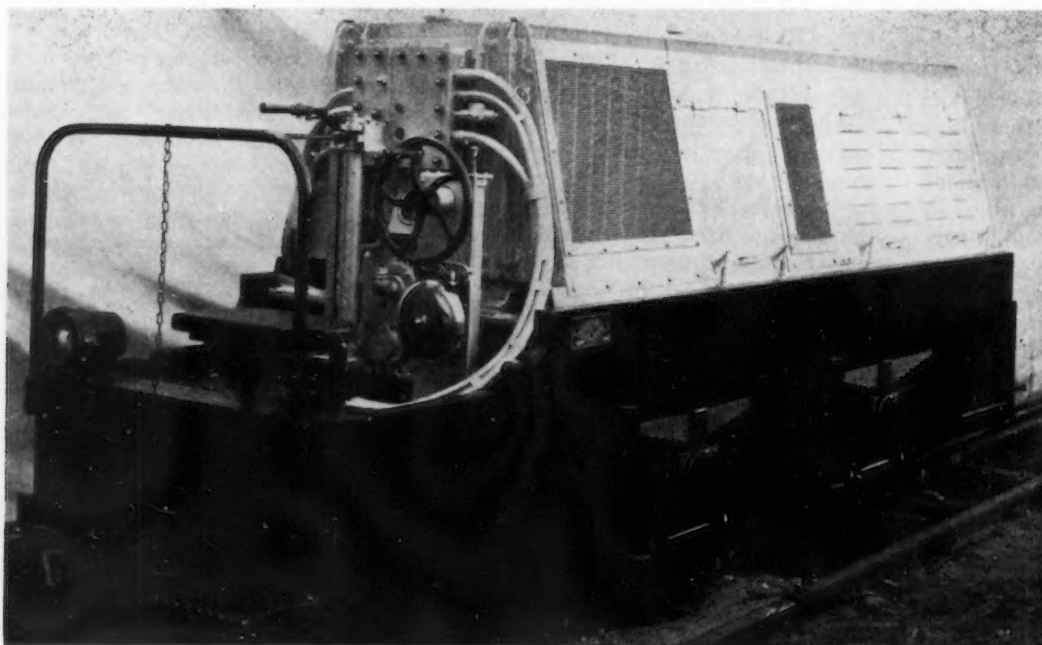
DURING the past few years, great progress has been made toward the successful application of hydraulic drives in automobiles, trucks and buses. In the industrial field, progress has been somewhat slower due to the problems involved in building larger units suitable for operation at lower speeds. Yet, because sliding gear transmissions are generally impractical under the same low speed, high torque conditions, the need for a hydraulic drive is more imperative than in the automotive field.

Internal combustion engines, so widely used industrially today, have low torque at low r.p.m., and the diesel is inherently a constant speed engine.

Hydraulic drives when applied to internal combustion engines have these advantages: smooth starting, absorption of shock loads and of engine torsional vibration, limiting torque capacity and high torque capacity at low r.p.m. On such applications as crane and shovel drives, switching locomotives and oil well drilling rigs, the performance is comparable to the steam engine which the internal combustion engine has been replacing and whose smoothness and flexibility has always been a challenge to the latter.

There are basically two types of hydraulic drives, the positive displacement type and the turbo type, which depends upon the kinetic energy of

the fluid discharged by an impeller or pump in the input side against the vanes of the turbine or runner. The latter hydro-kinetic type may be divided into fluid traction couplings and hydraulic converters. In the series of articles, by Francis Juraschek, on hydraulic drives, published in *THE IRON AGE*, April 13 and May 11, 1939, these two types were differentiated and a number of illustrations were presented of applications of the Vulcan-Sinclair hydraulic coupling, which is of English origin and is made in this country by the American Blower Co. A hydraulic torque converter of German design also was briefly analyzed.



° ° °
STEAM engine operating characteristics with high torque at low speeds are obtained in this Dravo-Whitcomb locomotive by combining a Twin Disc hydraulic torque converter with a Hercules diesel engine running at practically constant speed.
° ° °



MODEL DF 11500 Twin Disc torque converter. In the aluminum case at the rear of the unit is the overrunning clutch or free-wheeling unit for unloading the hydraulic turbine when direct drive is being used. The hand lever controls the action of the dual mechanical disk clutch employed to select either direct drive or drive through the torque converter.

Since the publication of these articles, the Twin Disc Clutch Co., Racine, Wis., has disclosed the development of multi-stage hydraulic torque converters based on the Lysholm-Smith system, and it is the purpose of this article to explain their construction and operating characteristics, which fit them so well for driving mobile or stationary industrial machinery powered by internal combustion engines.

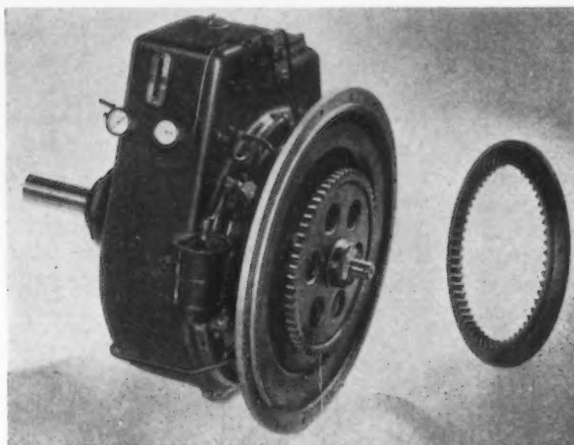
In both couplings and torque converters of the hydraulic type, drive is obtained by absorption and release of kinetic energy as the fluid gathers rotational velocity on the outward flow and loses rotational velocity on the inward flow. Capacities of the coupling and the converter are based on hydraulic laws in accordance with which the horsepower transmitted is in proportion to the cube of the speed and the torque capacity in proportion to the square of the speed. In the coupling, the impeller or driving member is the pump and the runner or driven member is the reaction turbine. The output torque is always equal to the input torque, but the r.p.m. of the output shaft lags somewhat behind the speed of the input shaft because of slip. A variable speed drive at constant torque is obtained by controlling the amount of fluid admitted to the coupling.

The basic or single stage converter is based on the same principle as the coupling except that a reaction member is introduced to change the direction of flow of the fluid and at the same time to act as a reaction point serving to alter the torque ratio between output and input shaft. These

shaft and extends from the maximum at stalling (about five times engine torque) down to the equivalent of the engine torque at approximately two-thirds engine speed. The drooping torque-speed characteristic is shown in a typical performance curve.

Such a unit when used in connection

MODEL F 11502 torque converter is the style used in the Dravo-Whitcomb locomotive illustrated elsewhere. Drive from the engine is transferred from the driving ring mounted on the flywheel (shown separately) through the spider mounted on the input shaft to the converter pump. The cooling water jacket assembly, which is optional, is shown here as an integral part of the upper case.

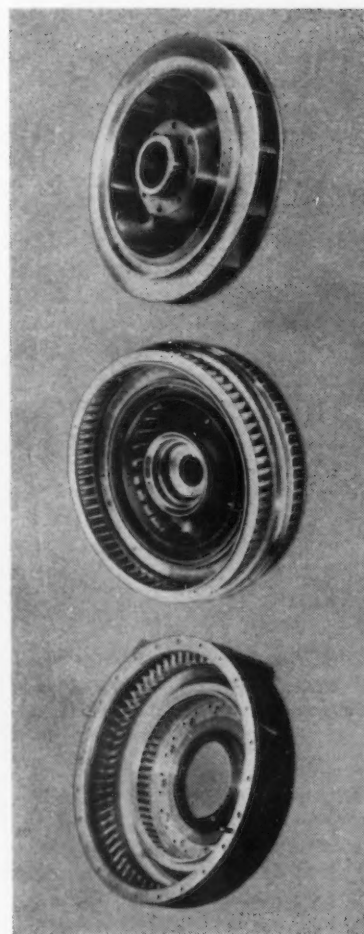


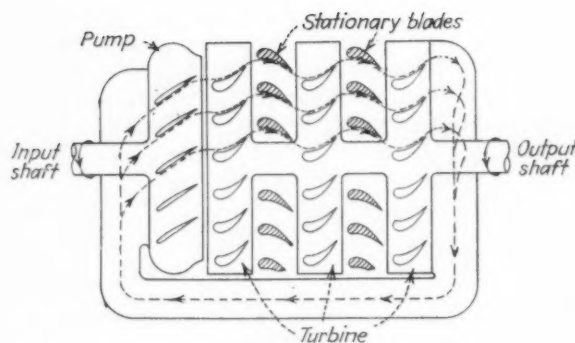
reaction blades are located in the converter housing which is bolted to the flywheel housing or stationary part of the engine, so that the reaction torque is actually added to the input torque, thereby increasing the torque at the output shaft of the converter.

Three-Stage Turbine

One of the basic features of the Lysholm-Smith design is the use of a three-stage turbine which has the effect of producing a high torque multiplication and an efficiency curve with a flat peak extending over a considerable range. The torque increase obtained in the converter is generated as the circulating fluid passes alternately through and reacts against the stages of the turbine and the stationary blades of the housing as shown in the schematic diagram. The available torque depends upon the speed ratio between the engine and the output

THE hydraulic portion of the Twin Disc hydraulic torque converter consists of the pump (upper) which is coupled to the engine and which creates the fluid head; the multi-stage turbine (center) which is connected to the output shaft and which has three separate rows of blades; and lastly the stationary housing (lower) in which two rows of blades are mounted so that they fit between each of the three turbine stages respectively





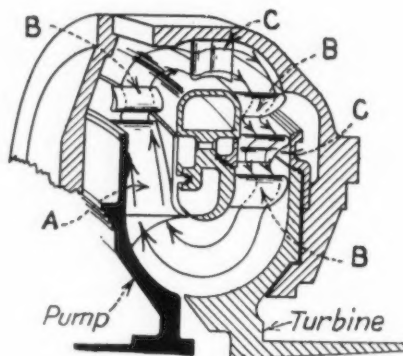
SCHEMATIC diagram of fluid circulation in a hydraulic torque converter. The torque increase obtained is generated as the circulating fluid passes alternately through and reacts against the stages of the turbine and the stationary blades mounted in the housing.

with an internal combustion engine permits what amounts to constant speed operation of the engine regardless of the speed of the driven unit. This characteristic is especially advantageous for the starting and acceleration of heavy loads. Output torque is automatically reduced as the speed increases. Even with the output shaft of the converter completely stalled as a result of extreme load conditions, the engine will continue running at its normal operating speed. The engine cannot be stalled with a hydraulic coupling either, but the engine speed will be lowered until input and stalled torque balance.

When driving through a converter, the engine will operate at a nearly constant speed whereby the converter pump will absorb the power delivered by the engine regardless of the speed of the output shaft of the converter. Actually, however, there is approximately a 20 per cent drop in the engine speed over the range from the maximum speed down to the stalling point of the secondary shaft. The operating range of this shaft is from standstill to approximately two-thirds of the corresponding engine speed, at which point the torque available at the output shaft is equal to the torque of the engine.

The converter has a flat efficiency curve with a peak of about 85 per cent. To insure satisfactory performance, the greatest amount of work should be

performed in the torque-speed range where the efficiency is above 70 per cent, which covers about two-thirds of the hydraulic drive operating range. The loss of efficiency causes a temperature rise of the fluid, and normally a small auxiliary radiator or a heat exchanger in conjunction with the engine cooling water system is installed, and part of the converter fluid is shunted through this cooling system.

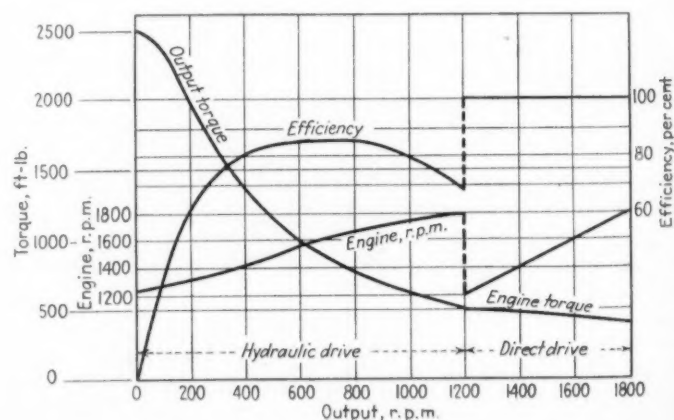


SIMPLIFIED cutaway of Lysholm-Smith type of torque converter. At A is a pump blade, while one of each of the set of three turbine blades are shown at B and the fixed housing blades are at C. To prevent short circuiting of the fluid between the individual stages, as well as between the rotating parts and the stationary housing, labyrinth seals are provided. Synthetic rubber seals are used to retain the fluid in the housing, and any fluid that leaks past them is collected in a sump and aspirated to a reserve tank from which make-up fluid is injected into the converter housing.

The blading can be modified within the capacity range of the converter to suit the corresponding horsepower and speed range of the engine. The standard series 11500 Twin Disc converters are suitable for transmitting 125 hp. at 1500 r.p.m. input speed or 200 hp. at 2000 r.p.m. Three models are available, differing in mechanical details, but all having the same hydraulic turbine. The model DF-11500 converter incorporates a duplex disk clutch at one end and an overrunning or freewheeling clutch at the other, enabling either hydraulic or direct drive to be effected. This model is for application to rail cars and similar equipment where the hydraulic drive is desirable during the acceleration period and direct drive at full speed operation. Shift from hydraulic to direct drive is made through the mechanical clutch when the output torque equals the input torque, which occurs at about two-thirds the maximum load speed. The freewheeling unit automatically disconnects the hydraulic turbine and eliminates any drag losses when the direct drive clutch is engaged.

Model F-11502 is the straight hydraulic converter without the direct drive feature and is generally applicable to services where heavy loads have continuously to be started, such as in hoists, cranes, switching locomotives, and oil field and logging equipment. Model IF-11505 is similar except that provision is made for sheave, pulley or sprocket connection at both input and output end, instead of being arranged for direct connection to the flywheel as the other two models are. This model is intended for industrial applications in connection with internal combustion engines having normal operating speeds that are lower than the input speed range of the converter itself. A cooling water jacket assembly is optional on the model F-11502, but is standard equipment on the model 11505.

PERFORMANCE characteristic of a three-stage hydraulic torque converter. Output torque is highest at stalling load and decreases until it equals engine torque (500 ft.-lb.) at about two-thirds rated engine speed (1800 r.p.m.). Efficiency peaks at 85 per cent at about one-half engine speed.



BEAMING gentleman in the center is Lester N. Shannon, Stockham Pipe Fittings Co., new president of A.F.A. To his left is Herbert S. Simpson, National Engineering Co., new vice-president of the association, and on the right is C. E. Westover, Burnside Steel Foundry Co., Chicago, chairman of Chicago chapter and general chairman of the convention committee.



FOUNDRYMEN SCRUTINIZE NEW CASTING PRACTICES

DRAMATIC proof of the renaissance of the casting industry that has taken place over the past few years was evidenced last week when about 9000 foundrymen from all parts of the United States and Canada gathered in Chicago for the 44th annual convention of the American Foundrymen's Association. Adding to these 9000, an additional 10,000 local foundrymen, apprentice boys and trade school students who stormed the doors of the Amphitheatre, where the equipment and supplies exhibition was housed, on preview day, May 4, brought total registration for the meeting to the record-breaking level of 18,000.

This revival of interest in castings is apparently the consequence of one of the most searching investigations into the characteristics and potentialities of cast metals ever undertaken by the industry. Most of the papers presented at the convention's technical sessions were directed toward this better understanding of the engineering

qualities of cast metals. Others were concerned with ways and means of obtaining closer and more accurate control of the factors influencing these qualities. This new spirit also found reflection in the numerous refinements in foundry equipment and supplies that were in evidence at the exhibit.

From the viewpoint of the equipment exhibit, the convention also established new records. About 220 exhibitors were represented at the display and their opinion, almost without dissent, was that the industry was in a "buying mood." This mood was attributed to long delayed replacement of obsolete equipment and expansion programs necessitated by the increased demand for castings from shipyards, machine tool builders, the automobile industry and, to a lesser degree, from the railroads.

As is customary at the annual meeting, the technical sessions were interrupted long enough to hold the annual business meeting. L. N. Shannon, vice-president of Stockham Pipe Fittings

Co., Birmingham, was elected president of the association at this meeting, and Herbert S. Simpson, president of National Engineering Co., Chicago, was elected vice-president. New members of the board of directors selected were Henry S. Washburn, Plainville Steel Casting Co., Plainville, Conn.; B. D. Claffey, General Malleable Corp., Waukesha, Wis.; George Cannon, Campbell Wyant & Cannon Foundry Co., Muskegon, Mich.; Harold J. Roast, Canadian Bronze Co., Ltd., Montreal, Que., and L. P. Robinson, Werner G. Smith Co., Cleveland.

The balance of the board of directors now consists of H. Bornstein, Deere & Company, Moline, Ill.; W. H. Doerfner, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich.; H. S. Hersey, C. O. Bartlett & Snow Co., Cleveland; G. A. Seyler, Lunkenheimer Co., Cincinnati; A. Walcher, American Steel Foundries, Chicago; W. B. Coleman, W. B. Coleman Co., Philadelphia; C. R. Culling, Carondelet Foundry Co., St. Louis,

O. A. Pfaff, American Foundry Equipment Co., Mishawaka, Ind.; Marshall Post, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., and Fred J. Walls, International Nickel Co., Detroit.

A feature of the annual meeting was the awarding of gold medals to four foundrymen in recognition of their meritorious service to the foundry industry. N. K. B. Patch of Lumen Bearing Co., Buffalo, was awarded the John A. Penton medal and F. K. Vial, Griffin Wheel Co., Chicago, received the J. H. Whiting award. The W. H. McFadden medal went to H. W. Dietert, Harry W. Dietert Co., Detroit, and F. A. Melmoth, Detroit Steel Casting Co., Detroit, was the recipient of the Joseph S. Seaman award. George A. T. Long, Pickands Mather & Co., Chicago, was granted an honorary life membership in the association in recognition of his many years in the pig iron and coke consulting field.

The annual board of awards address was delivered this year by Charles E. Wilson, executive vice-president, General Motors Corp. Mr. Wilson's address, "Industry's Responsibility to Youth," stressed that it was imperative that present-day youth's defeatist attitude be corrected if we are desirous of assuring the nation's continued progress. To do this it will be necessary to organize our educational processes on the same efficient basis as our production processes, Mr. Wilson said. Industry must take a larger interest in developing practical courses for young men and should encourage the employment of apprentices. Our educational activities, if they are to be effective, must teach young men how to work, the motor executive said. It is not enough that he be willing to work. In this endeavor the cooperation of industry is particularly vital.

The numerous papers presented at the technical session covered practically every phase of casting production. Unfortunately space limitation will not permit a detailed discussion here of all these papers.

A highlight of the technical sessions was the demonstration of crystallization presented by Dr. C. W. Mason, Cornell University. By means of a series of experiments, performed under a microscope and projected upon a screen, the formation of dendritic structures, segregation of impurities and other phenomena associated with the crystallization of materials was vividly brought out. Dr. Mason's comments, as the experiments progressed, gave one a very clear picture

New Directors of American Fo



H. S. Washburn



L. P. Robinson

of the factors responsible for various metallic structures. This demonstration was presented three times during the convention.

The problem of designing junctures in castings that can be produced with

sound metal throughout the joint is one that has vexed the industry ever since the birth of casting. Two papers read at the meeting touched upon this subject. In of the papers, "Application of External Chills in Production

Awarded Medals for C



N. K. B. Patch



H. W. Dietert

American Foundrymen's Association



H. J. Roast



G. W. Cannon



B. D. Claffey

of Steel Castings," read by W. F. McKee, Key Co., East St. Louis, the results of a series of tests to determine the effect of the position and size of chills upon the soundness of the joint were given. The drawings in Fig. 1,

based on photographs contained in McKee's paper, shows the extreme importance of the mass and position of the chills.

Probably the most difficult joint to cast without feeding direct is the

X-joint. All the specimens of this type of juncture covered by the paper showed some degree of defect, some admittedly minor, but all detrimental under today's stringent specifications. One way suggested to circumvent this obstacle was the use of the staggered X-joint. The author was able to cast a sound specimen of the staggered type by the chill arrangement shown at 2.

Conclusions drawn from these tests were that design, as well as placement, was of paramount importance; that chills should be designed to avoid re-entrant angles of sand at their sides or ends, except where it is desired to retard or control the chilling effect; that where chills are used at junctions, it is desirable to have the radii at least one-third as great as the section thickness, but never more than one-half as great.

The design of junctures to eliminate internal defects was also discussed in a paper presented by J. A. Duma and S. W. Brinson, both of Norfolk Navy Yard, Portsmouth, Va. The authors listed five fundamental methods of joining sections (Fig. 1) and discussed methods of distributing the metal at the joint to avoid hot spots. The methods shown in Fig. 1 are based on sketches slightly modified, previously prepared by Briggs, Gezelius and Donaldson.



F. A. Melmoth



F. K. Vial

for Outstanding Achievements

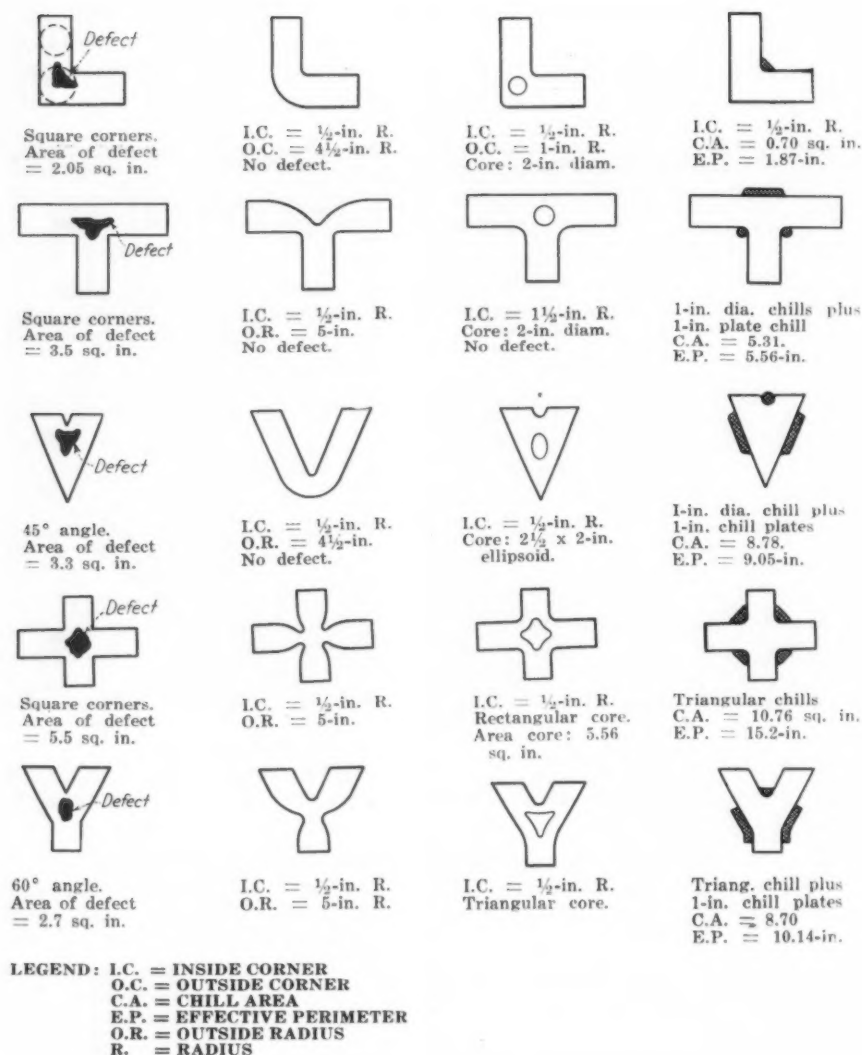


FIG. 1—Five basic ways of joining sections and suggested methods of distributing mass to insure sound junctures.

The authors of this paper, which dealt primarily with the production of large and intricately shaped castings, commended the use of models prior to making final patterns. They were of the opinion that this practice saved both time and money and its cost was put in the neighborhood of 2 per cent of the total foundry cost of the casting.

The question of the weldability of steels with carbon contents usually found in casting grades was discussed in a paper presented by A. J. Smith and J. W. Bolton, on behalf of Lunkeneimer Co., Cincinnati.

This paper brought out the fact that the structures developed in steels of 0.25 per cent C, as the result of welding, were as good as in steel of 0.15 per cent C and, as far as granulation was concerned, the wrought steel of 0.15 per cent C was inferior.

The practical problems involved in

desulphurizing, with fused soda ash, cupola irons made from charges containing from 83 to 100 per cent scrap were discussed in a paper read by W. Levi, Lynchburg Foundry Co., Lynchburg, Va. The author's experience was drawn from the operation of six cupolas.

The paper covered the experience obtained in the operation of six cupolas ranging in size (inside dimension of lining at melting zone) from 51 to 72 in. In melting a 100 per cent scrap charge, it is the Lynchburg foundry's practice to preheat the forehearth or teapot ladle with an oil torch for 1 1/2 to 3 hr. before the blast is turned on, with the aim of achieving a temperature of 2400 deg. F. in the lining before the iron is tapped into it. All soda ash is thoroughly dried before adding to the iron to drive out absorbed moisture. Each time iron is transferred from the forehearth to the

transfer ladle, sufficient soda ash is put into the forehearth to treat an amount of iron equal to that removed from the hearth by the transfer ladle. More efficient desulphurization is effected when there is a thin layer, rather than a heavy layer, of slag on the surface, it was found.

The amount of desulphurizer added depends on several factors—the type of reservoir used; the contact time between the desulphurizing agent and the molten iron; the amount of S present in the spout iron; the melting rate; coke ratio, and the degree of separation of the cupola slag from the molten iron before desulphurizing.

Discussing a specific example, that of a 51-in. cupola—melting 7.5 tons per hr. and feeding a rectangular reservoir of 3200-lb. capacity, Levi stated that the base metal with sulphur content of 0.136 was reduced to an average of 0.091 per cent with the addition of 11.6 lb. of soda ash per ton of metal. The cost of this soda ash, per ton of good castings, was put at 39.9c. and the cost of refractories for the forehearth lining, including labor and materials, averaged 3.90c. per ton of metal melted. The sulphur content of the by-product coke used in this example was 0.60 per cent.

Another interesting example cited by Levi was that covering two cupolas of identical dimensions, but feeding into two different types of teapot ladles. These cupolas worked on a 100 per cent scrap charge, melting at the rate of 16 tons per hr. Both receiving ladles were of 10 tons capacity, but one was U-shaped and one elliptical. The base metal going into the U-shaped reservoir carried 0.133 per cent S, and after treatment with 5.8 lb. of soda ash per ton, the S was reduced to 0.075 per cent. The refractory costs for the lining of this ladle was 4.1c. per ton of metal melted.

The base metal running into the elliptical ladle ran 0.137 S, and after treating with 6.4 lb. of soda ash per ton, this was lowered to 0.086 per cent. The refractory costs in this case averaged 4.3c. per ton of metal melted.

Thus, the S reduction in the U-shaped reservoir was 0.010 per cent per lb. of soda ash while in the elliptical type ladle it was only 0.0079 per cent. This difference the author credited to the difference in the ladle shapes.

Fluidity Improved

Levi also reported on the results of a series of tests run to compare the fluidity of untreated irons and metal treated with soda ash. The results of

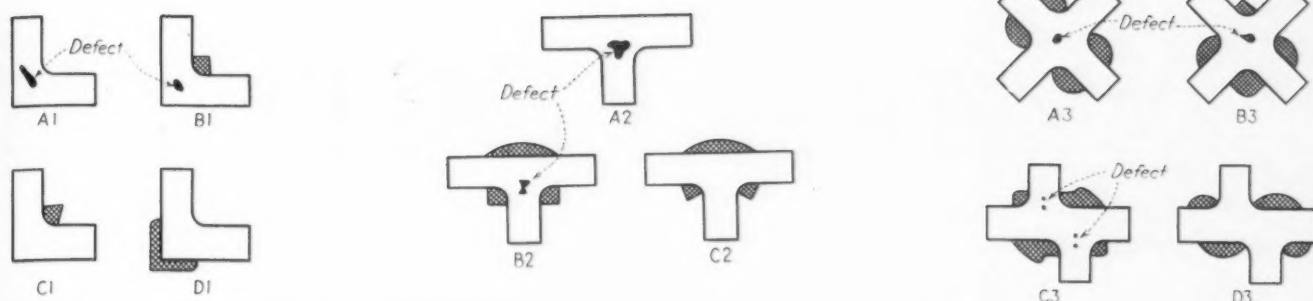


FIG. 2—Effectiveness of various chilling techniques, based on photographs in paper presented by W. F. McKee, is shown in these sketches. Importance of position, as well as size of chills, is clearly shown.

nine tests on each type averaged out to the following

	Untreated	Treated
Analysis	Iron	Iron
Si	1.60	1.56
S	0.137	0.086
P	0.52	0.54
Mn	0.41	0.39
TC	3.54	3.51
Fluidity	27.3 in.	36.4 in.

In making these tests the Standard A.F.A. fluidity test pattern was used. Both samples came from the same heat, one being caught directly from the cupola spout, the other from the desulphurizing ladle. The increase in fluidity in the treated sample averaged 33.3 per cent. Soda ash additions were 6.4 lb. per ton of molten metal.

An interesting comparison of refractory costs of naturally-formed refractory material and ordinary fire brick was reported on by J. A. Bowers and J. T. MacKenzie, both of American Cast Iron Pipe Co., Birmingham. The tests were conducted in three cupolas—21 in. and 54-in. circular, and 102 x 72 in. link-shaped. Two grades of natural-formed stone of local origin were compared with an ordinary fire brick (Table I).

In the 21-in. stack, cost per ton of the various refractories (including labor) was natural stone A, 89c.; natural stone B, 59c., and fire brick, 63c.

Refractory Costs

These costs are comparable only, and do not indicate actual refractory costs in the regular operation of the particular stack covered. To melt a similar amount of metal, the cupola would have to be relined and fully prepared three times with fire brick and stone B and only twice with stone A, it was found.

The tests run on the 54-in. cupola showed that the average life of cupola blocks was 1 2/3 heats, whereas the use of stone A resulted in an average

life of five heats before repatching was required. The qualities of stone B were not studied in the 54-in. stack since previous tests indicated it to be about equal to fire brick from the refractory standpoint. Regular 9-in. straights and splits were tried in the 54-in. stack, but the results were not as satisfactory as the proper sized cupola block.

The 54-in. cupola involved in these tests melted about 50 tons a day, using a 28 per cent scrap charge. The average cost of refractories in this cupola, using cupola blocks, was 16.3c. per ton of metal melted, while use of stone A gave average costs of 5.2c. per ton. It was found that no extra labor was required patching the stack when using the stone.

The conclusions drawn by Bowers and MacKenzie from these tests were: (1) That all three refractories could economically fill certain needs in the foundry; (2) The results showed clearly that stone A is a super-refractory and, in spite of its high initial cost, may prove more economical in some operations; (3) Stone B is about equal to the fire brick used in these tests from a refractory standpoint and can, because of its cheapness, be used economically in some types of operations in spite of the high labor cost necessary to lay it; (4) The fire brick used in these tests was not excelled in certain operations, particularly where cupola lining labor costs are relatively high.

One of the most important things to be learned from this type of investigation, the authors felt, was the importance of periodic cost studies of refractory consumption in any foundry.

The influence of sulphur on properties of electric furnace cast iron also received attention at meeting. Especially interesting data pertaining to machinability, resulting from an investigation conducted by F. Holtby

and R. L. Dowdell, both of University of Minnesota, are shown in Table II. Altogether Holtby and Dowdell made 40 casts of electric iron in their studies and a tabulation of the findings of this work indicates that at about 0.18 per cent sulphur there is a transition point in the properties of electric furnace cast iron. Up to that percentage, increased sulphur lowers transverse and tensile strengths and hardness and increases deflection and that at percentages above that figure, the reverse is true. An increase in sulphur, it was found, will decrease the resulting manganese analysis, the decrease being more rapid in iron containing more than 0.18 per cent sulphur. Flowability of the iron decreases rapidly at 0.18 per cent sulphur, the fluidity remaining the same above and below this amount, provided manganese is held constant and chill depth is not affected by sulphur, provided manganese content remains constant. Up to 0.14 per cent sulphur, machinability decreases, between 0.14 and 0.18 per cent sulphur, it increases and above the latter figure again decreases.

Oven Design Improved

An appraisal of the equipment and supplies exhibited at the Amphitheatre reveals that equipment makers today are primarily concerned with two things; lowering processing costs and providing instrumentalities for the closer control of the characteristics of cast metals. An example of this is the refinements in design visible in the core baking ovens shown by Paul Maehler Co. This oven now has an electrically operated lift door. This door is counterweighted to reduce the size of motor required and the counterweights are concealed in the door columns. The door is also equipped with safety latches, which, while normally holding the door securely against the jam, are designed to permit the

(CONTINUED ON PAGE 88)

WESTINGHOUSE STAGES

MORE than 100 delegates from the nation's leading machine tool manufacturers attended the fifth annual machine tool electrification forum held at East Pittsburgh, Pa., under the sponsorship of the Westinghouse Electric & Mfg. Co. The delegates, representing some 75 companies, were welcomed at the opening session by Bernard Lester, a special representative of Westinghouse, who introduced R. S. Kersh, of the machinery electrification section, in charge of forum arrangements. Papers were started with a presentation on adjustable speed drives operating from a.c. supply, by W. I. Bendz, Westinghouse district engineer of Boston, followed by a discussion of gearmotors by S. B. Brittain, of the gearing division. J. C. Wilson, mechanical engineer of the Thompson Grinder Co., described the combination of electrical and hydraulic operation of an automatic broach grinder. Last paper for the day was a brief presented by W. M. Moody, of the meter division, on electric tachometers.

The Tuesday morning meeting included a paper on "Streamlining" in electrical equipment design by D. L. Hadley, consulting engineer. C. B. Stainback, manager, industrial sales department, discussed the responsibilities of the electrical manufacturers to the machine tool industry, and the concluding paper of the morning was a description of electrical equipment for a special purpose grinding machine, given by R. S. Elberty, electrical engineer of the Landis Tool Co.

The Tuesday afternoon meeting included papers by C. W. Drake, manager of the general mill and resale section, industry engineering department; C. D. Moore, supervisor of trades training; R. W. Owens, manager, small motor division; and a paper by W. K. Bailey, sales manager of the Warner & Swasey Co., entitled "Improving Your Present Operators." The Wednesday morning meeting covered talks by D. K. Frost, electrical engineer, Mattison Machine Works, and by A. H. Platt, electrical engineer, Bullard Co. Typi-



SHOWN registering for the forum at East Pittsburgh are, from left to right, A. L. Krause, electrical engineer, Brown & Sharpe Mfg. Co.; R. H. Clark, electrical engineer, Warner & Swasey Co.; G. M. Harrower, vice-president, Brown & Zortman Machinery Co.; and W. Tribble, electrical engineer, Cincinnati Milling Machine Co.

cal wiring arrangements for basic control functions was discussed by O. G. Rutemiller, district engineer, Westinghouse company, Detroit. Wednesday afternoon was spent by some of the delegates in touring different sections of the Westinghouse East Pittsburgh and Nuttall works, after which the forum was brought to an official close by its annual dinner party.

The Human Element

In his opening remarks, speaking about the machine tool industry, Mr. Lester pointed out that where originally the thought was to make man adapt himself to the machine, now we have more than ever before us the job of making the machine further adaptable to man. It means further

a study of the natural and agreeable motions of working men, as well as many other factors, such as sight, touch and posture. Such progress will come through a closer study of man himself. Eye appeal will continue to become more of a factor to be desired and consequently will be given still more consideration in purchase and use.

Mr. Lester predicted that machine tools will be more completely equipped with all sorts of tell-tale or indicating and recording devices to tell at a glance just what the machine is actually doing at all times. He also indicated that methods of accomplishing adjustable and selective speed reductions and increases will receive an even greater degree of attention than

MACHINE TOOL FORUM

in times past. Such methods are going to be simplified, made more convenient, reliable, efficient, and apparatus will take up less space.

We must recognize, he continued, the increasing importance of further continued study of the size, location, structure and operating characteristics of those elements in a machine tool which produce the power, and simplification of the structures and operating members which translate this power to the point in a machine where it is put to work. Further accomplishment in these directions call for a more complete interchange of knowledge between the machine tool builder and the electrical equipment maker, and this is the purpose of these machine tool forums.

In the talk delivered by W. I. Bendz, a wide variety of systems were analyzed for obtaining variable speed drives from an a.c. power source. Most of the systems were of large horsepower and were built around a wound rotor induction motor, with

various methods employed for converting the secondary power of the wound rotor into useful form, such as the Scherbius system or a modification of it, instead of wasting it in a secondary resistor. These systems call for large and expensive auxiliary rotating equipment, such as converters and motor-generator sets.

Ignitron tubes also are being used successfully to convert the variable voltage, variable frequency output of a wound rotor secondary into d.c. to drive a motor. If this d.c. motor is coupled to the shaft of the induction machine a constant horsepower drive is obtained, whereas if the d.c. motor drives a motor-generator set pumping the output back into the a.c. supply line, a constant torque equipment is the result. The operating speed of the main drive is controlled by the field of the d.c. motor and by the grid control of the ignitron rectifier, thus giving maximum flexibility.

Grid controlled rectifier tubes, both thyatron and ignitron, are also being

used to operate d.c. motors directly from an a.c. power source. Speed variation is obtained by controlling the grid of the rectifier so as to regulate the current flow to the d.c. motor, the motor field being excited from a separate small rectifier. This type of drive has been applied to a small lathe, Mr. Bendz indicated. The speaker also explained the operating principles of electric couplings and hydraulic couplings used as speed reducers, as well as various types of mechanical variable speed units.

Mr. Bendz concluded his paper by describing a modification of the method of varying the resistance in the secondary of a wound rotor induction motor to obtain speed control. Such units are widely used, but have the drawback of poor speed regulation at low speed due to the change in voltage drop across the terminals of the secondary resistor that occurs with a change in load on the motor shaft. Recently a control unit has been developed to automatically adjust the secondary resistor so as to maintain the desired operating speed constant even though the load may vary widely. The cost of this control is much less than the equivalent rated motor-generator set drive. By using a 33-point motor operated rheostat, speed can be maintained within 5 per cent of the selected value.

Gearmotor Applications

Some of the possible applications of gearmotors in machinery drive were pointed out by S. B. Brittain of the Westinghouse gearing division. Gearmotors are of particular advantage in driving special machine tools which are at times made up of standard heads and assemblies and where the production quantities do not warrant the design and manufacture of special gear trains. On Wednesday afternoon, a number of the visitors were taken through the Nuttall division and shown how Westinghouse gearmotors are built.

In his talk on Tuesday morning on the responsibilities of the electrical manufacturer to the machine tool in-

AS was the case last year, R. S. Kersh of the machinery electrification section of Westinghouse was in charge of the machine tool electrification forum arrangements. He is shown here at the right chatting with Tell Berna, general manager of the National Machine Tool Builders' Association.



dustory. C. B. Stainback, manager of the industrial sales department, showed charts indicating how closely the curve of total bookings of electric motors followed the index of machine tool orders from year to year. Then by a series of humorous drawings by Cy Hungerford, famous Pittsburgh cartoonist, Mr. Stainback illustrated some of the demands of the machine tool manufacturer on the electrical equipment maker, such as improvement in appearance of the electrical equipment, reduction in size, holding down of vibration, and the meeting of delivery dates. Already steps have been taken to standardize the method of testing for unbalance, and the other demands are being met. In turn he pleaded for cooperation on the part of the machine tool industry in giving more consideration, in the initial stages of machine tool design, to the mounting of electrical equipment, or as the cartoon so aptly illustrated—"Leave room for the motor."

Trends in Styling

Steps taken to improve the appearance of electrical equipment were outlined by D. L. Hadley, styling consultant of the Westinghouse company. So-called streamlining of consumer devices, such as electric irons, he indicated had paid definite dividends in increased sales, but some people question why a generator should be streamlined. Mr. Hadley thinks that most industrial executives are conscious of modern design trends today through

LEAVE ROOM FOR THE MOTOR!



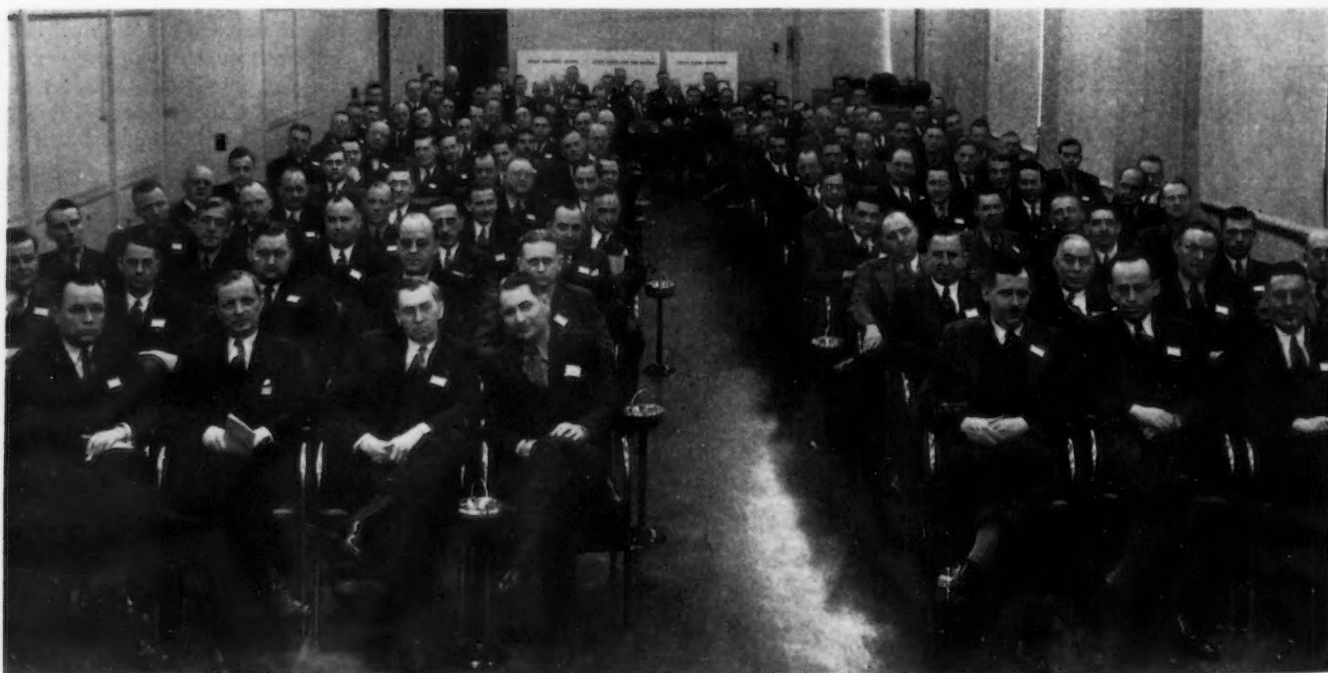
THE talents of Cy Hungerford, famous cartoonist, were called upon to bring home to machine tool designers and the electrical equipment manufacturer a few pithy points, such as the one illustrated above.

the influence of the various world's fairs, streamlined trains, modern office equipment and the graceful airplane. Hence better looking industrial equipment is looked for. The first step is the cleaning up of the exterior by the removal of protuberances and bumps. He congratulated the machine tool industry in taking the lead in applying modern clean-cut lines to its equipment.

In his paper, Mr. Wilson, of the Thompson Grinder Co., explained in detail how cycle sequencing was obtained in an automatic broach grinding machine through a combination of electrical and hydraulic controls. In this machine, the wheelhead is traversed across the work after each indexing between teeth. Control of this indexing, employing hydraulic table movement, is accomplished through a tooth locator finger which makes contact with the broach tooth. The hydraulic table movement is initiated by a dog on the rear end of the wheelhead slide that opens the hydraulic master valve by solenoid action and starts the table forward. Then when the next tooth of the broach comes in contact with the tooth locator finger, a precision switch is tripped, breaking (through a relay) the circuit to the table starting solenoid, bringing the master valve back to its center position and locking the table in position for grinding. Simultaneously, the circuit to the cross feed solenoid is closed, positioning the cross feed valve and moving the wheelhead slide forward over the broach. At the end of its stroke it pushes the tooth locator finger out of contact and reverses, ready for the next indexing movement.

Another application of electrical controls to a special type of grinding machine (a ball bearing race grinder) was detailed by R. S. Elberty of the

(CONTINUED ON PAGE 90)



THE fifth annual machine tool forum brought out a record breaking attendance. Over 120 visitors had registered when this picture was taken on Tuesday.

WHAT'S NEW IN FOUNDRY EQUIPMENT

By FRANK J. OLIVER
Associate Editor, *The Iron Age*

THIS compilation of announcements of the makers of foundry equipment in recent months gives a sampling of the latest equipment, and while not inclusive of everything that has been placed on the market in the past year, it serves as a guide point to trends in design of various classes of equipment.

WHEN first introduced, sand conditioning equipment was largely limited to high production foundries, but in recent years the trend has been toward the development of small portable units suitable for handling moderate quantities of sand. The introduction of the Royer Jr. sand conditioner a few months ago continues this trend into even smaller sizes. The unit, illustrated, is mounted on a single pneumatic tire and weighs only 270 lb. It has a capacity of 150 to 250 lb. of sand per min. and is made for use in bays or on floors for re-

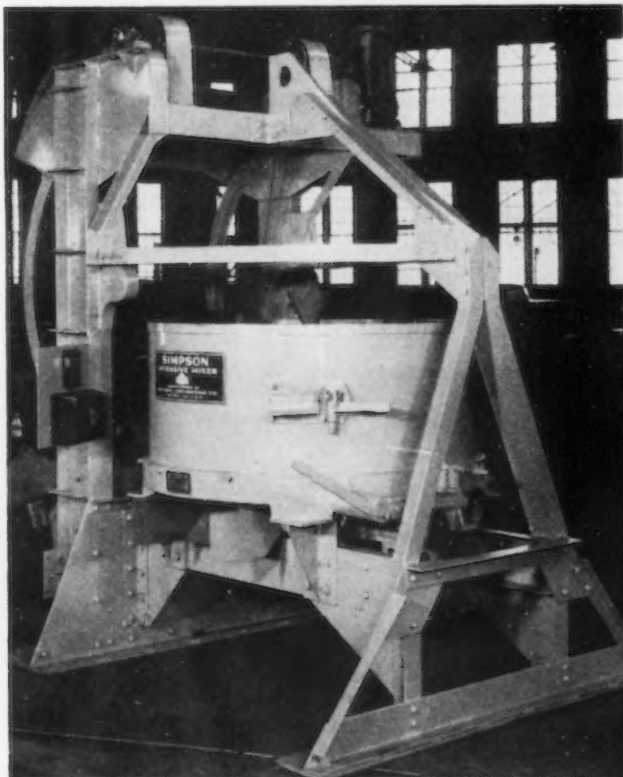
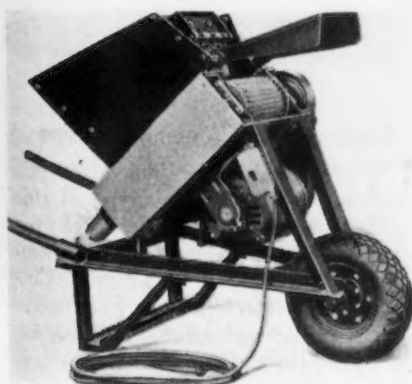
moving foreign matter, breaking lumps and clay balls, blending and mixing old and new sand, distributing moisture through the heap, increasing permeability and aerating and cooling the sand. It is regularly furnished with a totally inclosed 110/220-volt, single phase, 60-cycle motor, starter switch and cable.

In addition to the small machine illustrated, the *Royer Foundry & Machine Co.*, Kingston, Pa., has redesigned its entire line of larger sand conditioning units. Savings in weight

from 100 to 200 lb. per machine have been achieved and manufacturing economies plus increased production have made price reductions possible. On the portable models, the shoveling height has been reduced by 2 to 7½ in. Standard operating features have been retained.

Portable Simpson Mixer

THE *National Engineering Co.*, Chicago, has recently built a portable Simpson intensive mixer with pan measuring 4 ft. 6 in. and a straight lift



bucket loader. The unit is designed to be picked up by crane and moved from one part of the foundry to another, requiring only a reasonably level floor to operate. It is entirely controlled by push buttons. The mixer has a capacity of approximately 600 lb. of sand a batch, while the bucket loader permits one batch to be made ready while the preceding batch is being mixed.

Hydro-Blast Cleaning Barrel

THE dust problem is an important one in any foundry. It is being solved by dust collecting systems or by methods of suppressing dust at the



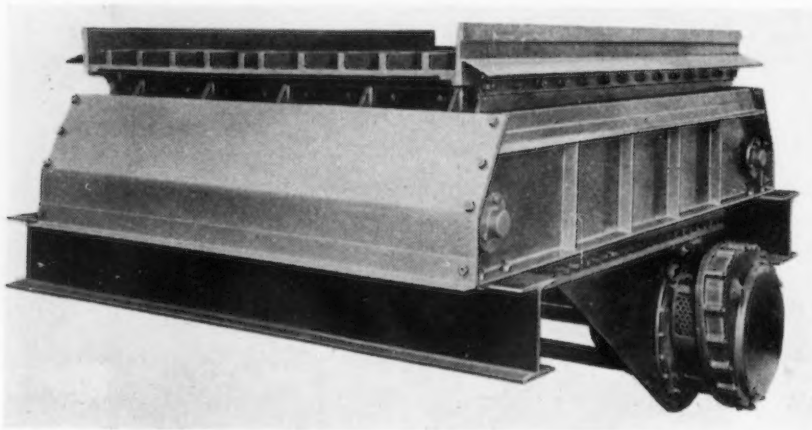
source. The Hydro-Blast cleaning barrel recently announced by the *Whiting Corp.*, Harvey, Ill., represents the latter approach. In this unit castings are cleaned by the action of a high pressure sand and water stream while

they are being tumbled in a rotating barrel. Besides wetting down every particle of dust and dirt, the stream also removes all cores and the scouring action gives the castings a smooth, satiny surface that is suitable for painting or enameling. Furthermore, the scouring action removes all scale and burned sand, thus increasing the machinability of the castings. Rust may be avoided by the use of a bi-chromate inhibitor solution injected into the barrel for about 20 sec. after each load is cleaned.

Operating costs average about \$1 a ton for gray iron castings. This figure is based using 30 gal. of water per min. at 15c. per 1000 gal., power at 2c. per kw/hr. and blasting about 50 min. out of every hour. The average load for a 36 x 42 in. barrel is 600 lb. The heavy steel plate barrel with rubber sealed door is rotated from 1/2 to 3 r.p.m., and a motor operated oscillating nozzle plays the stream of sand and water on all parts of the castings during the tumbling operation. The sand used is that taken from cleaned castings and used over and over again. A high pressure pump delivers water at 1200-lb. pressure. Clean castings are unloaded by rotating the barrel in reverse direction.

Shake-Out Screen

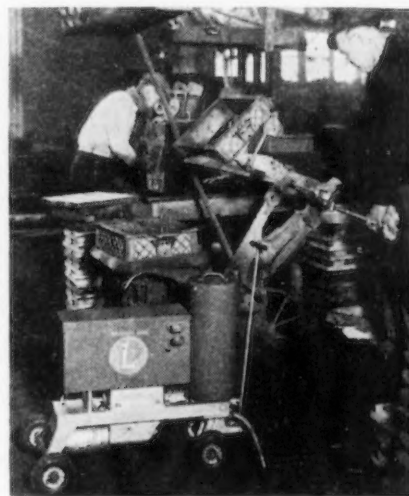
A SHAKE-OUT screen for shaking sand from small castings or from flasks weighing up to four tons has been recently placed on the market by the *Robins Conveying Belt Co.*, Passaic, N. J. The vibratory motion of the screening surface is said to be rapid and sharp, quickly loosening all sand. The loads on the screen are cushioned by heavy coil springs and no weight loads are carried by shafts or bearings. Drive and vibrator are completely protected below the floor,



and hot sand is prevented from getting near any moving part of the vibrating mechanism or to the bearings of the screen. The top surface of the screen is flat and is 2 ft. above floor level. These shake-out screens are made in a range of sizes from 4 to 5 ft. wide and from 6 1/2 up to 10 1/2 ft. long.

Portable Electric Grease Gun

WHILE not specifically designed for foundry use, nevertheless the Pressure-Lube portable electric grease gun illustrated is adaptable for lubricating fixed or portable foundry equipment, such as the jolt squeeze



stripper shown. This grease gun is unique in that it depends upon storage battery power to drive the 6-volt electric starter type motor. One battery charge is sufficient for more than 5000 grease shots at ordinary pressures. Battery is recharged at intervals by a built-in G.E. tungar rectifier. Unit is supported on ball bearing wheels, with pneumatic or solid tires. Lubricating hose will withstand pressure up to 40,000 lb. per sq. in., although 12,000 lb. is the operating pressure, and will handle the heaviest grease in the coldest weather. This unit, made by *Pressurelube, Inc.*, New York, is being marketed through the *Fruehauf Trailer Co.*, Detroit.

Dustless, Star Cleaning Machine

DUST suppression has also been achieved in a new type of side loading, star cleaning machine for large castings developed by *N. Ransohoff, Inc.*, 410 West 71st Street, Cincinnati. This machine is a combination of a side loading wet tumbling barrel, an automatic end unloading star sep-

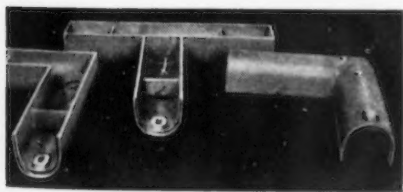
aration and return barrel and an automatic sand settler and remover. The basic model of this machine cleans castings up to 24 in. in an operating cycle of 50 min., including loading, tumbling and unloading time. The process formerly required 4 hr.

After packing the tumbling section in the usual way, the machine is started and the tumbling section automatically fills itself with stars and the entire contents are flushed with a mild caustic solution which carries away the sand as fast as it is loosened by the stars. After the work is cleaned, a port is opened into the star return section, the machine is reversed at half speed and the work is discharged out of the end over a rotating screen. The stars are separated out and are held for charging into the tumbling section when the next batch is loaded.

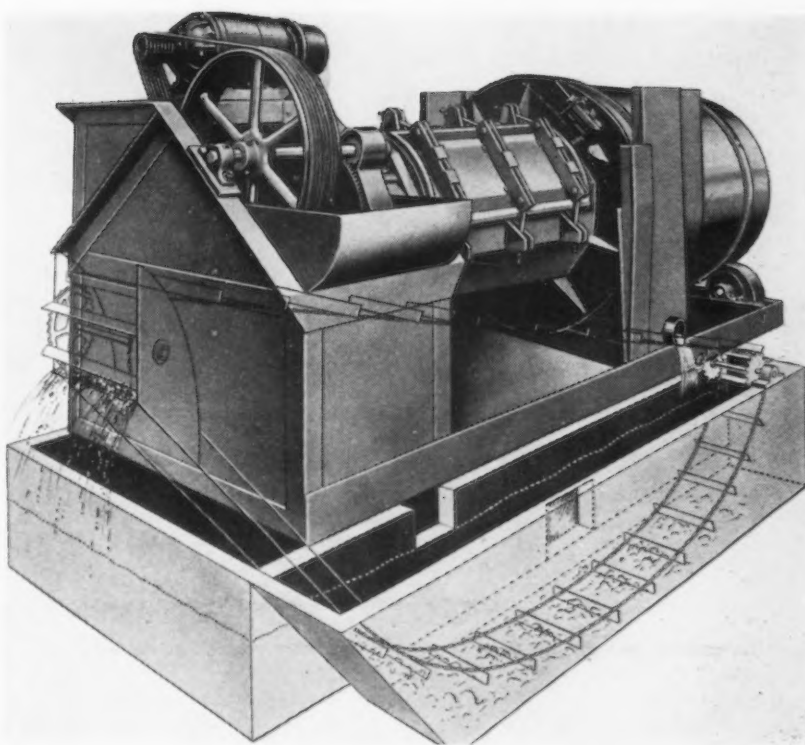
The solution carrying the sand is caught in a settling tank where practically all of the sand settles and is continuously removed by the flight conveyor shown. The cleaning solution flows through a weir back into the main tank for reuse. The continuous removal of loose sand by the solution allows the stars to work continuously on hard sand, thus reducing cleaning time and mill wear.

Storage Bins

DEVELOPED for use in its own foundries, but now available to outside plants, are the bin wall caps shown, made by the *American Manganese Steel Division* of the *American Brake Shoe & Foundry Co.*, Chicago Heights, Ill. The caps are applied to the wall tops of bins used to store ferrous melting stocks, such as steel scrap and pig iron. The caps are cast of 13 per cent manganese steel, selected be-



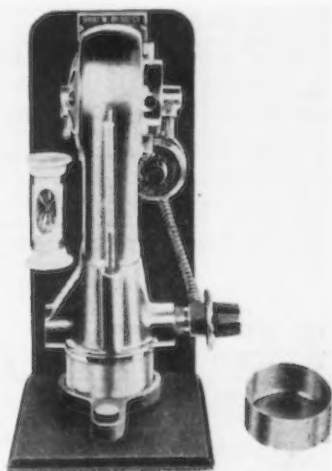
cause of its high resistance to impact and because its austenitic structure makes it non-magnetic as well. Hence any fouling of lifting magnets and the possibility of pulling the caps loose are avoided. The individual castings, made with inner reinforcing members, are welded together into units, such as T's, L's and long straight pieces, be-



fore application. Studs are cast in the concrete walls during erection and the caps are fastened to these.

Moisture Teller

THE *Harry W. Dietert Co.*, of Detroit has added to its line a new size moisture teller that takes a smaller sample pan, measuring $2\frac{3}{4}$ in. in diameter and $1\frac{1}{4}$ in. in depth. The bottom of the pan is made of 500 mesh monel metal filter cloth. Drying air is forced through the sample in the usual way, and the sample is dried to constant weight in as short a time as 1 min. for many materials. The small pan size is such that the sample can be readily weighed on a sensitive analytical balance.



Dust Collectors

A HIGH efficiency, long cone dust collector has been placed on the market by the *American Foundry Equipment Co.*, 580 S. Byrkit Street, Mishawaka, Ind. Dust laden air enters an upper cylinder tangentially in the conventional manner and gets further centrifugal separation in a much longer lower cylinder. At the base of the latter is a long cone leading to the sealed dust hopper. Unusually high efficiencies are obtained with relatively low back pressure, and actual collecting efficiency is said to be close to that obtained with filter type collectors and is the same as obtained in an average wet dust collector. The air volume can be varied widely from rated capacity without seriously affecting the efficiency. The collectors are made of heavy gage metal to withstand scouring action of the dust.

New sizes of assembled type Dustube dust collectors are also announced by the *American Foundry Equipment Co.* Filter tubes are 5 in. in diameter and 70 in. long, the number depending upon the size of the unit. Capacities range from 270 cu. ft. per min. for the No. 1 size with 12 tubes at 3:1 pressure ratio, up to 1080 cu. ft. per min. for the No. 4 size with 48 tubes. Housing is of No. 14 gage steel, welded throughout. The units all stand 9 ft. 2 in. high.

THIS WEEK ON THE

By W. F. SHERMAN
Detroit Editor

ASSEMBLY LINE

... Disadvantages of frameless automobile are cited by engineer ... "Tune-up" to control overall rigidity of body and frame called necessary to insure pleasant ride ... Production schedules balanced against current sales reports by industry ... Output trend is downward to 98,480 units ... Ford opens tool and die shop to tool engineer group for visit.

DETROIT—The frameless automobile, or rather the all-welded unitary type of construction, has been so highly touted that it is something of a surprise to have many of the popular ideas on the subject analyzed critically and unfavorably. There has been in recent years a general opinion that the use of the automobile body itself as the principal structure, with the elimination of the separate frame, must certainly result in great cost savings and weight reduction. More than that, it was tacitly assumed that such unit construction would promote a feeling of safety and "solidness" because of the rigidity of the vehicle.

Relative merit of the two types of construction was analyzed recently before an audience of S.A.E. members

by D. W. Sherman, chief engineer of the A. O. Smith Corp., Milwaukee, whose business is the production of chassis frames. Citing test results dating back 15 years, the engineer built up a case to support the following contentions which probably will be repeated many times in many technical arguments before the balance swings definitely in favor of either type of construction. He declared

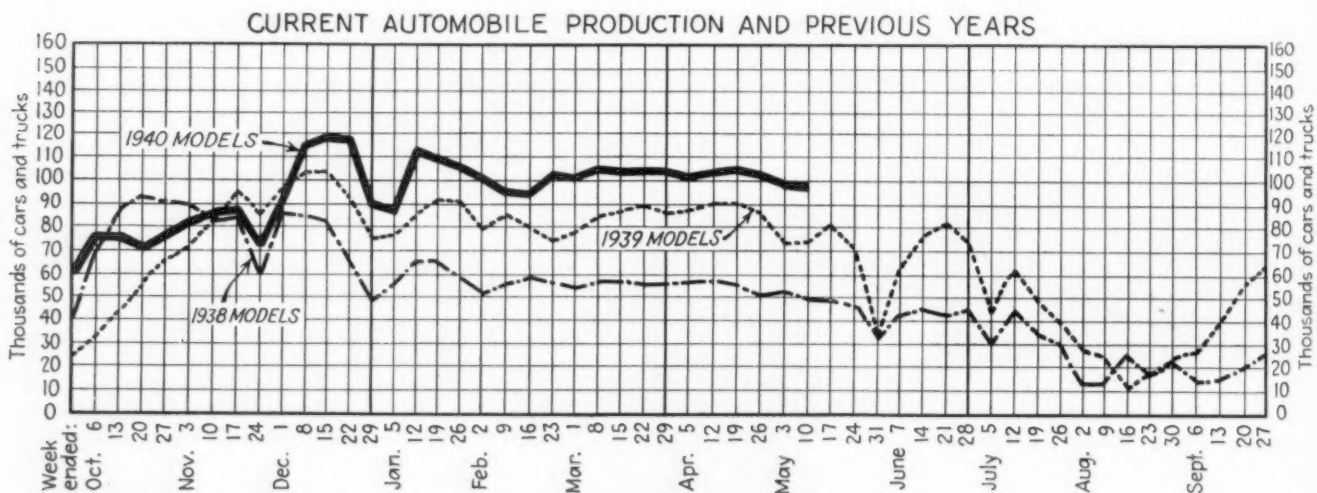
1. By substituting a unit type construction for a separate frame, it should be possible to reduce the weight of the average car by approximately 100 lb. (More weight reduction than this might definitely affect riding and quietness qualities, he intimated.) Under most favor

able circumstances costs probably would be higher than for the car with separate frame. Should models be changed yearly, it is doubtful if weight could be saved, and the cost might get out of hand.

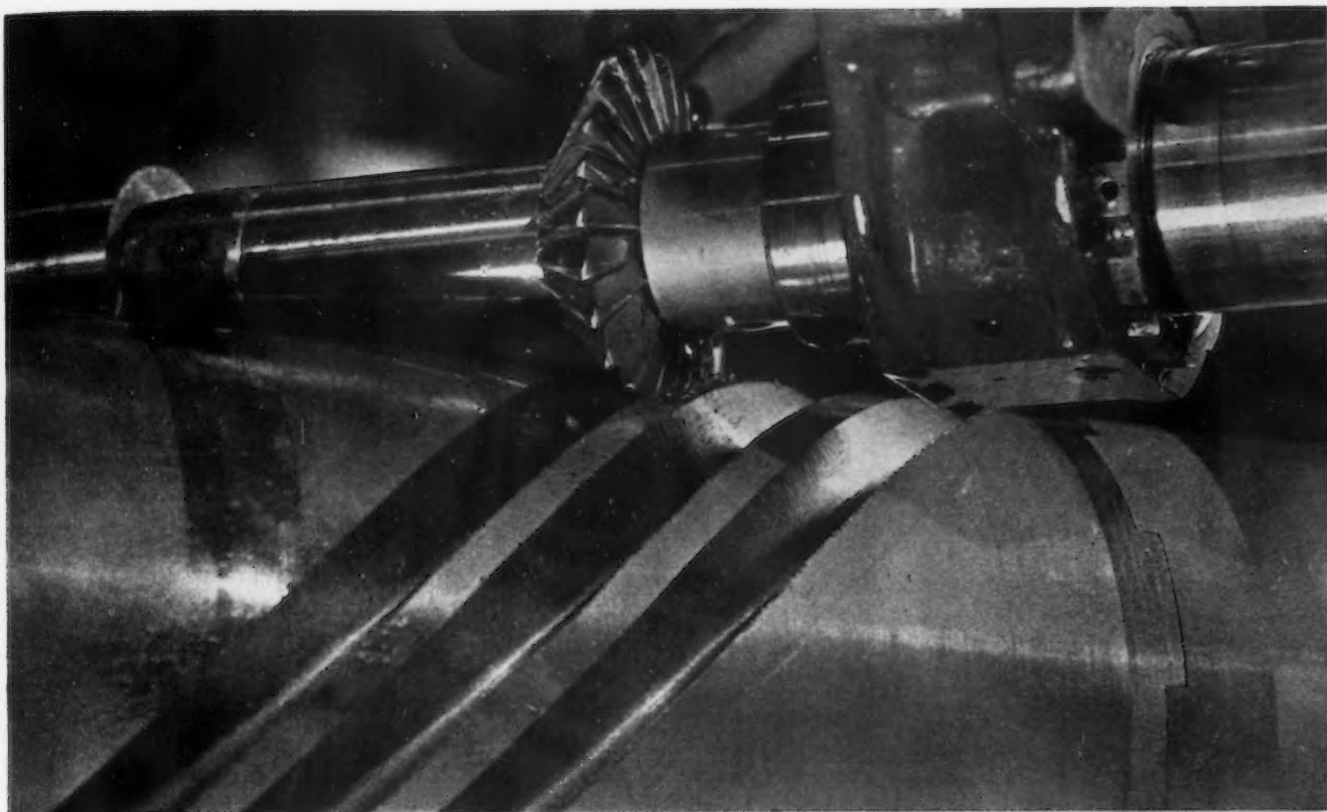
2. Considering the car body and frame purely as a structure, it should be possible to achieve practically the same weight ratio with bolted connections between body and frame as with welded connections. Welding might save 25 lb.

3. The separate frame and body is due for considerable improvement within the next few years, such that a new standard will be set for car performance.

As a fundamental, Mr. Sherman stressed that structures having the proportions of an automobile frame or a car body "do not, in 99 per cent of the cases, function with any similarity whatsoever to the conventional load-carrying member as designed from a handbook formula on stress and strain. ... Members of these proportions do not act according to figures in most cases, either for durability or stiff-

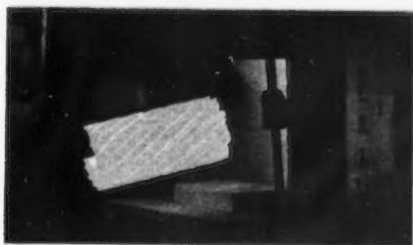


P R O D U C T I O N C O M P A R I S O N S				
	Oct., Nov. and Dec.		Jan., Feb. and March	
1938 MODELS	1,032,201		753,470	
1939 MODELS	1,014,799		1,086,350	
1940 MODELS	1,162,990		1,325,630	
	Total to date			



ACCURACY . . .

cuts cutter costs



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Division Niles-Bement-Pond Company • West Hartford, Connecticut, U. S. A.

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You can get Pratt & Whitney milling cutters in all kinds and sizes. Tell us your needs and let Pratt & Whitney accuracy cut your cutter costs.

ness." This condition is responsible for the fact that laboratory tests and road tests necessarily take precedence over drafting room computations in the design of auto bodies and frames.

He traced the evolution of bodies and frames from the days when the ladder-type frame was used. The adoption of the rubber engine mounting confronted the engineers with a decided lack of frame rigidity, which resulted in the introduction of the X-member frame. Shortly afterward the all-steel body was introduced, followed by independent suspension of the front wheels which again accentuated the problem of car rigidity.

The auto body and frame combination, the engineer asserted, is not analogous to a platform with a house riding around on top of it. Instead it is "purposely proportioned so as to be comparatively flexible and inexpensive where the body is stiff, and the reverse where the body section is weak."

"We have, in fact," Mr. Sherman declared, "a composite construction, except that the job with separate frame has certain qualities and possibilities that the unitary construction does not have." The crux of his argument dealt with the effects of struc-



DEAN D. FRANCIS (above), heads the newly-organized Sheet-Wire Corp., Detroit, as president and treasurer. The company will utilize a new process for large scale production of wire and similar products.

tural rigidity on the "ride." The almost intangible factor of "ride" is dependent largely on the rigidity-weight

ratio of the car. He pointed out that the combined rigidity, or stiffness, of a body-frame assembly can range from the direct sum of the separate rigidity figures to a value considerably higher, depending upon the rigidity of the tie-up. Soft rubber mountings would represent one extreme, metal-to-metal mountings, or welded connections, the other. The unit construction, which could be very stiff, might have a harsh ride, with no possibility of adjustment; but the separate frame construction permits the designer to "tune the job to the best rigidity range."

He likened the frame and body to a leaf spring having two leaves and the unitary construction to a leaf spring having only one leaf. "With the two-leaf spring," he said, "we can alter its characteristics by decreasing or increasing the resistance between the leaves and we can also dissipate energy by introducing inserts which have high damping value."

Forthcoming production schedules hang in the balance with last-minute sales reports, and the speed of the industry's assembly lines in the period just ahead will be determined largely by the sales rate. Production during March was nicely gaged almost exactly at the sales level; during April, however, the industry began its job of trimming down the half-million-car inventory with which it entered the spring selling season. Now, in the home stretch, production departments are trying to gage output so the sales forces will wind up the model year without excess stocks.

Automobile production held to a fairly steady pace during the last week, maintaining its margin over the corresponding period of last year. Output totaled 98,480 passenger cars and trucks in the United States and Canada, compared with 99,305 in the previous week and 72,375 in the corresponding period of last year, according to Ward's Automotive Reports. This represents the third consecutive week of slight decline. Four-day weeks are becoming more general as production is lightened. The final week of May probably will have only three working days in it because of the Decoration Day holiday.

In view of the necessity to gage production with sales it is important to note that the sales curve continued upward through the last days of April. In the last 10-day period of the month (the most recent for which any figures are available) more cars were sold than in the preceding 10 days or in the initial 10 days. For instance, in the mid-month period Pontiac sold 7716

THE BULL OF THE WOODS

BY J. R. WILLIAMS



cars, and in the final period the company sold 7855 (retail deliveries). Chevrolet made an advance of 4485 units in the final 10-day period, sales totaling 39,976 cars.

Preparations for the 41st annual National Automobile Show took another step last week when manufacturers of 20 passenger cars and nine makes of commercial vehicles participated in a drawing for floor space in the Grand Central Palace, New York.

Ford, participating again after a great many years' absence, sought space on the mezzanine floor and will have 2644 sq. ft. for the Ford-Mercury display and 2725 sq. ft. for the Lincoln-Zephyr exhibit. On the third floor Ford will use 3337 sq. ft. to display trucks and commercial cars.

Incidentally Ford Motor Co. proved to be a generous host when it opened its 8¼ acre tool and die shop at the Rouge plant to members of the American Society of Tool Engineers last week for a Detroit chapter meeting. More than 525 attended a dinner at the Ford Administration Building, heard a concise description of the tool and die facilities and program, and then were permitted to wander at will through the beautifully equipped shop where 1100 machines were working on tools, dies, jigs and fixtures for Ford's 1941 cars and trucks. This unparalleled willingness to expose the inner workings of a new model program to such a diversified and even competitive group of individuals undoubtedly indicates that this industrial age has no secrets!

Machine Tool Backlog 300 Millions, Berna Says

PITTSBURGH—Here to attend the Westinghouse Electric & Mfg. Co. annual machine tool electrification forum, Tell Berna, general manager, Machine Tool Builders Association, Cleveland, indicated that his industry's backlog approximates \$300,000,000, about half of which is foreign business. He added, however, that domestic consumers get preference in deliveries and production is assured until well into 1941.

Machine tool builders, according to Mr. Berna, fear that European nations will use their machine tools after the war to compete more intensively with American manufacturers and they are also worrying about the possibility of difficult personnel problems after the war is over. The danger of over-expansion, however, is being given constant attention but, should the United States get into the war, all restraints in respect to expansion would be swept aside overnight.



CHAMFERING GEAR TEETH

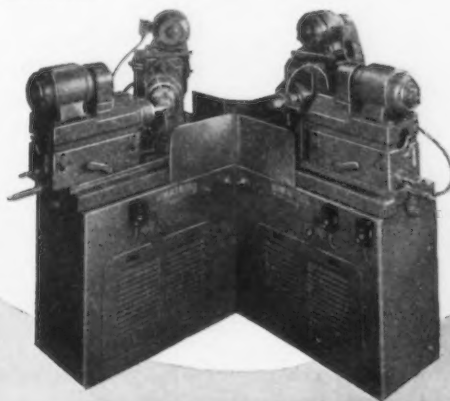
Is Now An Inexpensive Production Operation

CIMATOOL chamfering machines incorporate the principle that has finally combined flexibility with economy in gear tooth chamfering. Instead of presenting the tool to the work, Cimatool machines are built on the principle of presenting the work to the cutter, which rotates in a fixed position. This allows a heavier cutter spindle mounting and provides greater stability throughout.

Further, it permits the use of the hollowmill and pencil cutters as well as end mills and special cutters. Practically any type of chamfer is available from a regular wedge to any combination of circular arcs.

The work head incorporates all the mechanism necessary to the control of the machining operation. It is independently driven and its indexing movement is mechanically positive (always locked in mesh). Because of this construction it is not only quicker to set up but it provides higher production speeds.

The work gear spindle moves forward and backward in instant response to the rotation of a guide cam in the head assembly. The shape of this cam may be varied to provide any rate of cutting feed and in the case of pencil cutters an almost infinite variety of chamfers.



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FOR COMPLETE
INFORMATION**

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Dayton, Ohio, U.S.A.

DIEMAKERS • MACHINE TOOLS • TOOL MAKERS

THIS WEEK IN WASHINGTON

... Nazi invasion of Low Countries increases concern in United States . . . Defense appropriations to rise . . . Army seeks additional funds . . . Walsh-Healey Act's wage clause may be extended to other industries.

By L. W. MOFFETT
The Iron Age

WASHINGTON—The Nazi invasion of the Low Countries has stimulated moves to further strengthen the country's military defense, calling upon industry not only for greater supplies for air, land and sea forces, but to speed production. This is not to say that there is an alarmist atmosphere in Washington. But the spread of the war plainly has increased concern lest it reach to the Western Hemisphere. Even for those who affect to think such a danger does not exist, there are growing numbers who believe the greatest assurance against it is to be much better prepared than the United States now is.

President Roosevelt in an unusually outspoken address told the American Scientific Conference last Friday night that the Nazi aggression is a definite threat to the security of the Americas. While emphasizing again what he said was his determination to keep the United States at peace and safeguard the country's neutrality, he declared that the time had come to apply common-sense principles to the situation now confronting the Americas.

Naval Expansion Not Opposed

Developments in Europe reacted immediately in War, Navy and Congressional circles. Discussion centered around the contemplated passage by Congress with little or no opposition of the pending bill authorizing an 11 per cent increase in naval strength. Already reported to the Senate favorably by the Naval Affairs Committee, the measure makes no appropriations but would allow appropriation committees of both houses to provide funds within the limits fixed by the annual supply bills.

Authorized are \$6,000,000 in appropriations for installation of additional armor plate facilities in private plants

working on naval contracts; power to shift tonnage as between aircraft carriers, cruisers and submarines to an extent not exceeding 33,400 tons; appropriations to modernize the battleships *Texas*, *New York* and *Arkansas* by increasing gun range and raising the level of fire; and authority to enter into contracts for \$5,000,000 worth of naval construction in Hawaii. Another amendment approved by the committee would empower the President to name a civilian naval consulting board of seven members who would serve at his pleasure on a per diem basis of compensation.

Naval Inquiry Launched

The House Naval Committee went ahead with the plans to launch an unusual inquiry into the country's naval and aviation programs. Up for consideration are the possibilities for putting the fleet construction program on a 24-hr. basis; whether the Walsh-Healey Public Contracts Act and other laws affecting Government purchasing policies are a deterrent to naval expansion (there have been expressions that the shipbuilding program is not proceeding at a satisfactory pace); and whether as indicated in some quarters the training of aviators was falling behind plans for building up aerial defenses.

Meanwhile, the Army was understood to have under advisement a plan to ask Congress for \$200,000,000 in addition to the \$784,999,094 called for in the pending \$784,999,094 Army appropriation measure.

The program, it was indicated, may involve

1. Contracts for 500 new four-motored flying fortresses to cost \$400,000 each. There are about 250 of these aircraft either on hand or ordered under the current expansion pro-

gram which authorized an air force of 6000 planes, of which orders have been let for 5500.

2. Contracts for additional anti-aircraft guns of the latest design. In use now are 3-in. guns and the new plans are expected to provide for guns of a different caliber in addition to containing certain improvements, the nature of which remains undisclosed. Although the funds to be requested under this phase of the program may not be large, the report coincides with recent testimony given Congressional committees that the Army lacks anti-aircraft equipment.

War Clouds a Factor

If Congress puts its stamp of approval on additional defense appropriation requests, it will be due to growing concern over the European situation. The \$784,999,094 army appropriation measure previously was cut more than \$68,000,000 under budget estimates and the House appropriated for only 57 planes—14 amphibians, 6 transports and 37 advanced training planes—in contrast to the 500 planes which had been requested. Explanations advanced for the House action was that the replacements were not necessary until 1942 and that members felt there was no need for making appropriations for all replacements at this time. That attitude, however, represented the viewpoint of House members several weeks ago.

On the heels of Congressional reaction that presaged a heavier defense burden on industry with concomitant defense orders, came reports that Allied purchasing agents would rely more heavily on this country's aircraft plants than originally planned. Earlier, there were rumors that authorities familiar with Allied negotiations were puzzled by an unexplained lag in purchases by Great Britain and France. That observation appears to have changed somewhat upon word that the Allies ordered 2000 or more additional planes last week. The aircraft orders were understood to call for an undisclosed number of Martin bombers in addition to a number of fast pursuit ships developed for the Air Corps by the North American Aviation Corp., Inglewood, Cal.

There were indications, too, that the Government was taking precaution against the possibility of sabotage in industrial plants. While this represents no new departure from a policy



"I want Easy Roll MonoRail!"

"You mean American?"

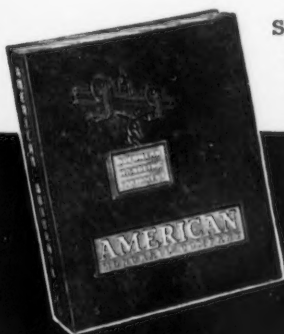
"Sure, that's it! The track we put up the other day—the gang in the shop says the trolleys are so easy to push."

"That's right! I saw the first guy try it out. His load got away from him and rolled 30 feet down the track before it stopped. I guess he was used to our old rail."

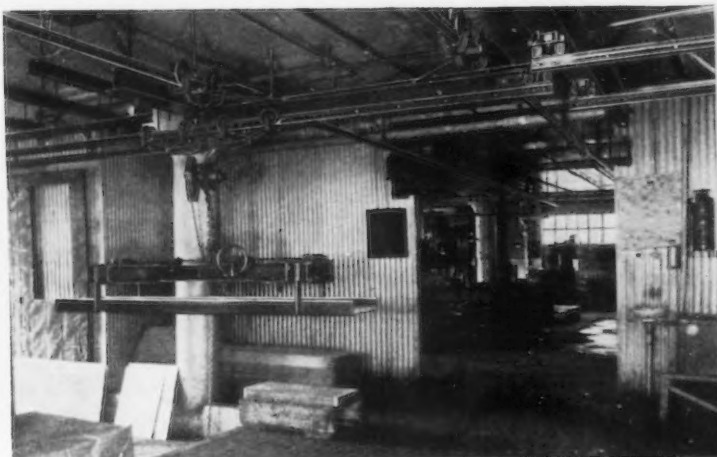
This actually happened in a large automotive plant where they originally installed their own overhead system. They now call for "Easy Roll" track, a name they coined after the above experience.

American MonoRail is "Easy Roll" because it's a high carbon, twin section rail, with overlapping splice to eliminate butt joints and a one piece forged hanger clamped in the rail head to prevent interference with trolleys. Trolleys "Roll Easy" because they contain precision bearings.

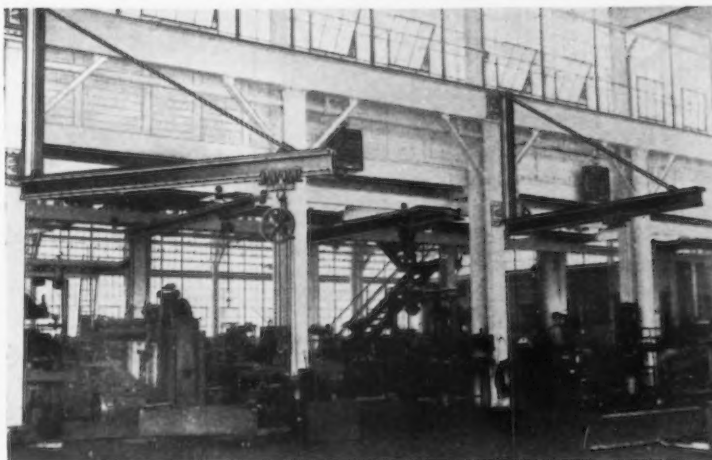
Let an American MonoRail engineer show you these features and explain the cost saving advantages of specialized overhead handling equipment.



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Two cabs operate on long span crane.

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MANUFACTURED by an improved process developed by Parker-Kalon, these superior cold-forged Socket Screws, Wing Nuts, Cap Nuts and Thumb Screws excel in the accuracy, uniformity and strength that critical users insist on. And yet, because of Parker-Kalon's unmatched production facilities, they cost no more than ordinary products! Write for free samples and prices. No obligation.

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adopted several months ago when special instructions were given the Federal Bureau of Investigation, a new unit headed by Lawrence M. C. Smith has been established in the Department of Justice. Identified as the Justice Department's Neutrality Laws Unit, and operating directly under the Attorney General with autonomous authority, the unit has charge of prosecutions involving neutrality law violations, sedition, espionage, sabotage and kindred offenses.

The German invasion also directed concern over its possible effect on the supply of such raw materials and tin and rubber and on exports to Holland and Belgium, now invaded, and to Switzerland.

The effect of a possible invasion of the Dutch East Indies, source of tin and rubber supplies, is said to have been considered at a conference with department officials hurriedly called by Secretary of Commerce Hopkins and at a later meeting the Secretary held a conference with members of the Business Advisory Council at which data were prepared and submitted to the President at a session of the cabinet.

Japan Might Seize Islands

While Japan has insisted that the status quo of the Dutch East Indies must be maintained, there is evident apprehension that that country might take advantage of the German invasion and seek to take the islands because of their rich supplies of strategic materials. Secretary Hull's pointed warning against any attack on the islands, together with the manoeuvres of the American Navy, is believed to have caused Japan to announce a hands-off policy.

The Netherlands Indies are a highly important source of American imports of rubber. While the chief imports of tin come from British Malaya, substantial quantities also are obtained from the Netherlands Indies.

Imports of tin in pigs, bars, etc. from the Netherlands Indies during the first quarter of 1940 amounted to 2,426,351 lb. out of total imports of 57,531,657 lb. British Malaya supplied 49,113,550 lb. In 1939 imports of tin aggregated 157,028,803 lb. of which 11,906,799 lb. came from the Dutch East Indies while British Malaya supplied 104,798,767 lb. Imports from the Netherlands proper last year amounted to 2,258,036 lb. and imports from Belgium were 2,956,428 lb. Of total imports aggregating 111,326,139 lb. in 1938, the Netherlands Indies supplied 6,936,024 lb. while imports from Brit-

ish Malaya were 82,146,688 lb. Imports from the Netherlands proper were 4,963,335 lb. while shipments coming from Belgium were 394,518 lb.

Exports Up to Low Countries

Exports of iron and steel products to the Netherlands have shown a sharp increase since the outbreak of the war last September, while a more moderate increase has been made in shipments to Belgium. In the first quarter of 1940 iron and steel shipments to the Netherlands totaled 52,160 gross tons compared with 26,460 tons in the corresponding period of last year. Exports in 1939 rose to 116,262 tons compared with 85,293 tons in 1938. The chief products exported were plain black plates for shipbuilding; tin plate and sheets. First quarter exports to Belgium totaled 10,595 tons against 2310 tons in the first three months of last year, while 1939 shipments were 13,102 tons compared with 7610 tons in 1938. The Belgian purchases consisted of small lots of miscellaneous lines.

Imports from the Netherlands consisted chiefly of pig iron and ferromanganese but in the first quarter of 1940 totaled only eight tons compared with 4695 tons in the corresponding period of last year. Imports from the Netherlands in 1939 were 15,385 tons compared with 20,732 tons in 1938.

Imports from Belgium consisted chiefly of shapes, solid and hollow bars and hoops and bands. In the first quarter of 1940 imports from that country were 1465 tons compared with 19,419 tons in the corresponding period of 1938. Imports in 1939 totaled 73,524 tons against 76,202 tons in 1938.

Machinery Exports Higher

Iron and steel exports to Norway in the first quarter of 1940 totaled 38,188 tons compared with 3103 tons in the corresponding period of last year and in 1939 they were 42,533 tons against 12,152 tons in 1938. These exports consisted principally of ship plates, black steel sheets, wire rods and tin plate.

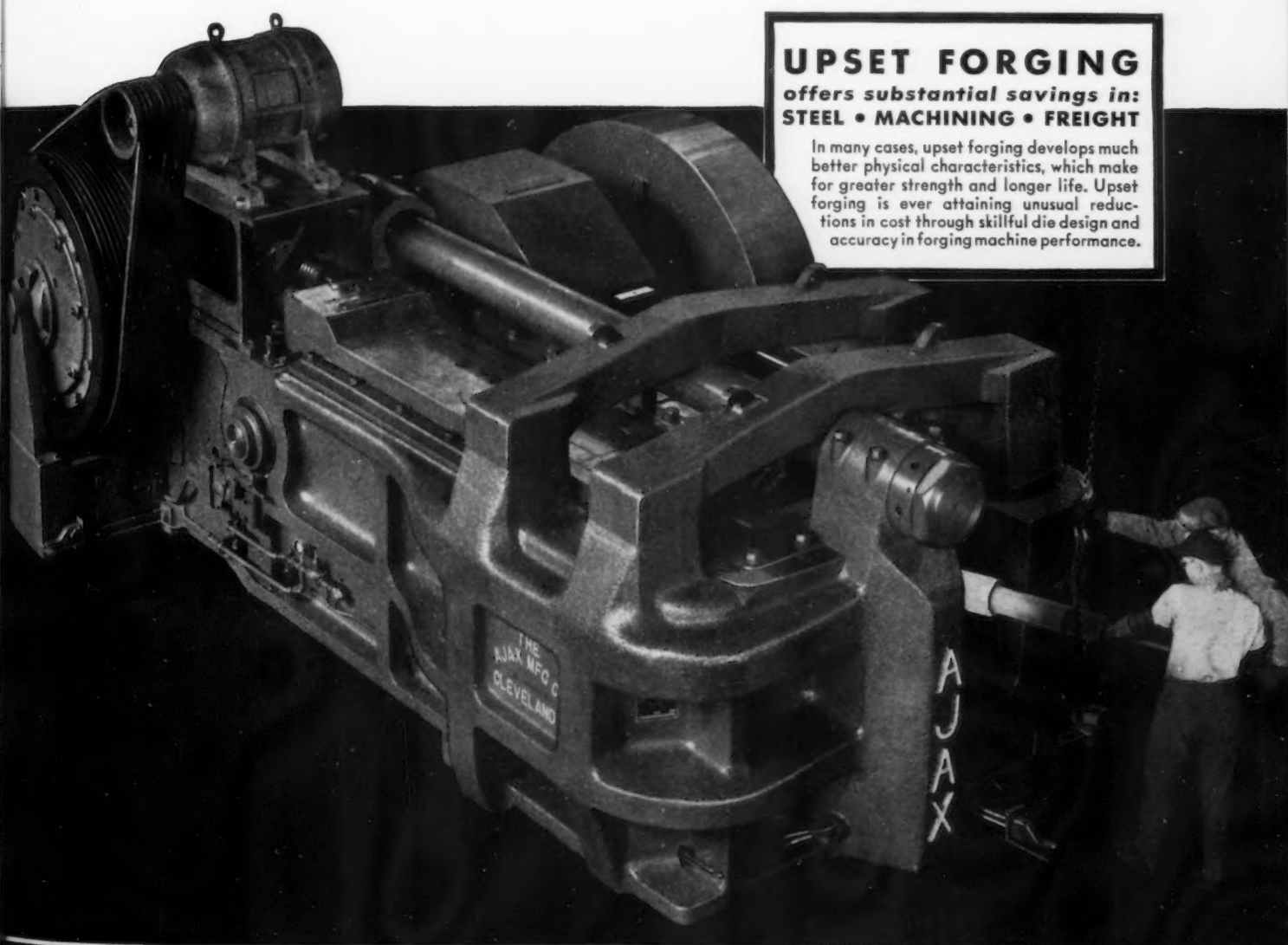
Exports of machinery to these German-invaded countries also have shown important increases as also has been the case with respect to the Netherlands Indies.

Exports of industrial machinery, exclusive of electrical equipment, to the Netherlands in 1939 totaled \$2,361,038 compared with \$2,103,027 in 1938, while similar exports to the Netherlands Indies amounted to \$6,527,989 and \$4,842,101 respectively. Farm machinery exports to the Netherlands

340 tons of steel saved on 136,000 forgings through high-degree accuracy of die and tool alignment in **AJAX** forging machines

FIVE POUNDS OF STEEL saved per forging on a forging that required deep piercing. Close tolerances attained reduced machining to a minimum. Such accuracy is not exceptional on Ajax forging machines because the top-suspended, outboard guided die slide carries the moving die into perfect match with the stationary die, and the extension guided header slide carries the

heading tools in perfect alignment with the die impressions. This results in consistently uniform, accurately matched forgings. Seemingly difficult operations are rendered easy with the precision matching of all die elements in these machines. More accurate and speedier production are commonly realized advantages of using Ajax air clutch forging machines. Write for Bulletin 65-A.



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THROUGH 1000 PLATING CYCLES WITHOUT BREAKDOWN!



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A prominent metal working plant ran an actual test on "Unichrome" Rack Coating-W*, the new rack coating developed by United Chromium. Here's what this user had to say:

"The test rack left with us in January was used at least 1000 times before we took it out of service, because the rack needed repair. At that time, the coating was still in a serviceable condition (May). *Your coating material is the best we have ever tried.*"

Thoroughly proved on installations in many leading plating plants, "Unichrome" Rack Coating-W* has the following outstanding advantages:

1. Withstands boiling cleaners and all plating solutions.
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5. Easy to apply—by "dip and force dry" method.
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Write for Bulletin No. 15

Containing complete information

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last year totaled \$537,148 against \$436,214 in 1938 and agricultural machinery exports to the Netherlands Indies were \$350,247 and \$324,333 respectively.

Exports of industrial machinery to Belgium in 1939 were valued at \$1,576,460 against \$1,346,145 in 1938

while farm machinery exports to that country totaled \$156,605 and \$209,121 respectively. Exports of industrial machinery to Norway last year were valued at \$1,078,238 compared with \$1,115,958 in 1938. Farm machinery exports to Norway were valued at \$621,600 and \$349,950 respectively.

Walsh-Healey Wage Clause May Cover Other Industries

WASHINGTON — Labor Department officials charged with the administration of the Walsh-Healey Public Contracts Act declined comment this week on prospects for small Eastern steel mills obtaining exemption from the steel wage order, which becomes effective later this month as a result of the recent Supreme Court decision. But there were indications that the court decision, which held that determinations made under the law are not subject to court review, has prompted new steps to bring additional industries under the law's minimum wage machinery.

Applications for exemption, as outlined under Sec. 6 of the law, cannot be made until a contract is awarded. The procedure would be for a steel company adversely affected by the prescribed wage rates to make a request to the contracting agency. The purchasing agency in turn would make overtures to the Labor Department if it felt that failure to permit an exemption would seriously impair the conduct of Government business. The Secretary of Labor could modify the terms of a wage stipulation if she determined that the joint recommendation warranted such action.

Notices Must Cover Wages

But before the question of exemption comes up, the Public Contracts Division will first instruct all government contracting agencies that the court injunction, which has permitted all steel companies to bid on government contracts since March, 1939, without regard to the wage order, has been vacated, and that all future invitations to bid must contain notice of the steel wage requirements. Since any bid invitations sent out in the interim will not include notice of the steel wage stipulation, contracts awarded on the basis of such invitations will not contain a wage stipulation even though they are awarded after the steel wage order becomes effective.

Some authorities expressed the view that there would be no immediate steps taken to obtain exemptions after the order becomes thus for there are no steel bids in the offing likely to involve contracts of \$10,000 or more. Contracts below that figure are not affected by the Walsh-Healey law.

May Include Other Industries

Meanwhile, there were signs that the Public Contracts Division, spurred on by the court decision upholding its steel wage action, would seek to bring additional industries under the law. Government contractors irrespective of industry are already required to sign maximum hour stipulations but minimum wage requirements have been prescribed for not more than 32 industries including iron and steel; aircraft; small arms and ammunition; and cement. Conferences with the electrical machinery and sand and gravel industries will be the subject of public hearings later this month and representatives of the boiler shop products industry have been directed to conduct a wage survey, preliminary to public hearings—a step which always precedes minimum wage recommendations based on prevailing minimum rates.

While officials are reluctant to discuss additional industries likely to be made the subject of minimum wage determinations it is understood that future wage negotiations may be inaugurated with the die casting, and the bolts, nuts and rivets industries. At least nine other industries making a wide range of products may also be factors in the revitalized Walsh-Healey program.

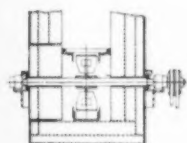
Navy Apprehensive

Invocation of the Labor Department's steel wage order late this month will come at a time when national defense contracts will become increasingly important, and when Army and Navy purchasing agents desire less rather than more restrictions placed on purchasing machinery. The Navy De-

A nameplate that's going places!

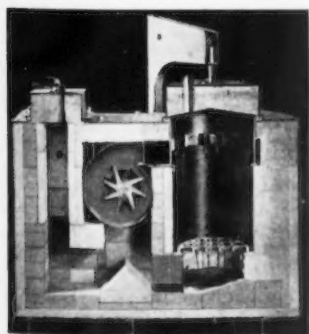


To Paris . . . London . . . Rangoon . . . Johannesburg . . . Melbourne . . . Rio . . . and, of course, in far greater numbers, to heat treating shops in the United States and Canada, Cyclone Tempering Furnaces are being shipped out of Chicago every day. The Cyclone's passport to world-wide popularity is its laboratory heating accuracy plus battleship construction, and heat treaters will tell you that they've never before seen such hairline heating precision, nor ability to stand up and be slam-banged 24 hours a day, day in and day out, without the slightest evidence of faltering.



"catches the engineer's eye"

What is it in the Cyclone that enables it to heat so accurately, so rapidly, and with such amazing stamina? First, it's the Cyclone circulating principle by which huge quantities of accurately heated air are driven through even the densest charge at velocities up around two miles a minute. A blast so powerful that there has never yet been a charge that could resist it. This two mile a minute blast is created by the powerful Cyclone blower fan, the design of which catches the engineer's eye every time, and makes him say, "that's the way a fan operating at heat ought to be built." And he's got



a point there, too! For all chance of sway or tendency to throw out of balance is eliminated in this construction, and what's more, the complete fan assembly is lined up to perfection and then doweled into place so that it automatically lines up

correctly if and when repairs might ever be required.

Then he notices another important point: that heat is generated in a chamber remote from the work chamber so that there's absolutely no chance for radiant heat to strike the charge and make the hardness readings run low in one part of the work basket, high in another part. The *only* heat that reaches the work is heat at the exact temperature desired by the operator to draw his load properly.

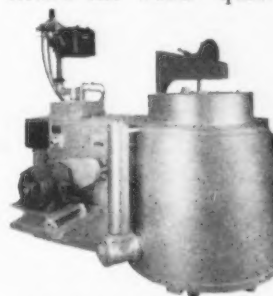
And just one squint into the work chamber of the Cyclone is enough to make him exclaim, "It's a husky brute; it ought to be able to stand up under punishment," and stand up and take it is only half the story! Rimmed with a massive casting which forms the air distribution duct, and also takes the brunt of abuse from heavily loaded baskets being swayed and jammed against it, and protected below with "armor plate" lining, this Cyclone just never heard the word "quit."



"stand up and take it is only half the story"

We like folks to handle their Cyclones with care, but if you're given to a rough nature, don't hold back on our account. The Cyclone will take all the abuse you can give, and more.

These are just a few of the things that are giving these Cyclone nameplates passports to the most exacting heat



"the kind of tempering that gets talked about"

treating shops in the world . . . a few of the things that go into giving heat treaters the kind of tempering that gets talked about, so that heat treaters today are buying twice as many Cyclones as all the rest of the air tempering furnaces put together.

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E N G I N E E R I N G C O M P A N Y
228 NORTH LAFLIN STREET, CHICAGO

partment is known to be apprehensive over the results of the steel wage order. On the basis of its past experience, the number of companies bidding can be expected to drop off materially unless they plan to ask steel wage exemption upon being awarded a contract.

One argument frequently advanced by representatives of small steel mills from the date of the first public hearing on the steel wage case up through the 13 months of litigations was that

to subject mills to a 62½c. minimum wage in an area where the prevailing rate is 52½c. would tend toward monopoly. The Labor Department declined to consider this factor in arriving at its determination but subsequent developments substantiated that statement by small companies to a considerable degree.

Testimony submitted to a House Labor Subcommittee by a Navy Department official in May, 1939, indicates that the minimum wage deter-

mination in the iron and steel industry "practically eliminated competition in the industry while it was in effect."

Only Two Bidders

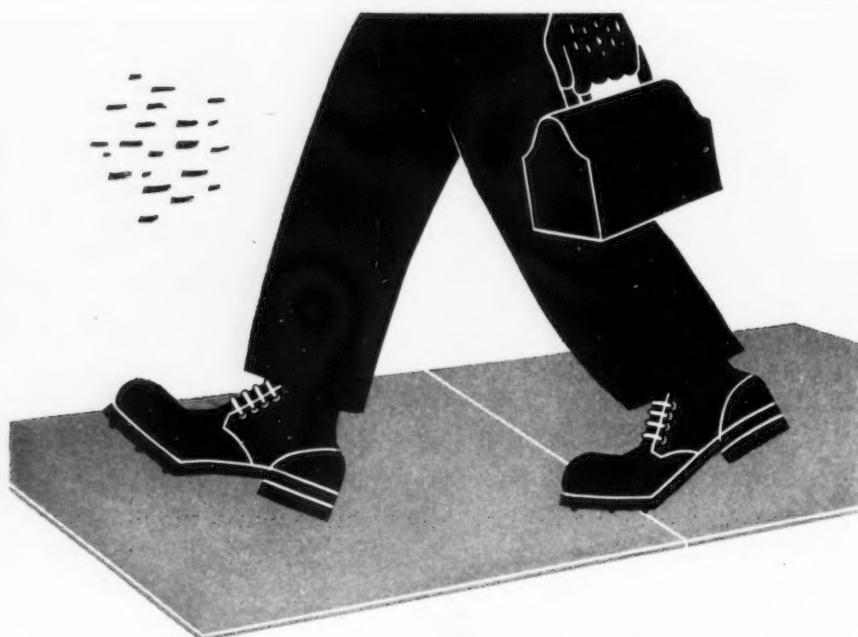
Capt. C. W. Fisher, of the Navy Department's Construction Corps, testifying in opposition to a bill to broaden the Walsh-Healey law, referred to that period in March, 1939, before the Circuit Court of Appeals suspended the steel wage order on behalf of seven steel companies in the East.

"The bidding on steel, while the minimum wage determination was in effect," Captain Fisher said, "was confined to two bidders agreeing to the stipulations, and as only one of these could produce steel within the range required, the bidding was limited on some items to one bid. Bidding is now normal due to the temporary court injunction suspending this wage determination . . .

"The smaller concerns have more apprehension about taking government contracts imposing uncertain liabilities upon them. They have not readily available legal advice, like that of larger corporations, and any provision imposing a penalty in their dealing with the government is a matter of concern."

The Supreme Court decision on the steel wage case, written by Justice Hugo Black, was severely critical of restraints imposed by the courts on the government purchasing machinery but reference to restraints imposed by Congress—of which there are no less than 220 in separate statutory enactments including the Walsh-Healey law to be adhered to by government purchasing agents—was conspicuously missing.

The Black opinion may have been a scholarly dissertation on the fine points of law involved but as a practical matter observers found difficulty in placing government purchasing restraints invoked by the courts into a different category than those imposed by Congress. Apparently a restraint on government purchasing machinery is not any mere surface restraint. Under the Black opinion, a restraint is what the court says it is.



He put it to the "HOB-NAIL" Test!

• Yes, that's just what happened in a manufacturer's roughshod test on painted sheets of galvanized ARMCO PAINTGRIP and ordinary galvanized.

To compare paint adherence he placed a painted sheet of both metals on the floor in a three-foot hallway. Employees walked on them four times daily—hob-nails and all!

After four months, paint on the PAINTGRIP panel was evenly worn but not chipped. Paint on the ordinary galvanized sheet revealed peeling, caused by brittleness of the paint and lack of adherence.

A decisive test, that! Yet paint

adherence is only one of the reasons why ARMCO PAINTGRIP can help you save money and make money. PAINTGRIP needs no pre-treatment, no weathering. Its special bonderized finish takes paint and helps preserve it. There are no zinc oxides at the surface to dry out paint and rob it of its elasticity.

Why not try ARMCO PAINTGRIP for your painted products? Then you can get a good idea of the shop-savings, and the increased service life PAINTGRIP can give your products. Write The American Rolling Mill Company, 1180 Curtis St., Middletown, Ohio.



Col. J. Monroe Johnson Is Appointed to ICC

WASHINGTON—Col. J. Monroe Johnson, Assistant Secretary of Commerce, has been appointed by President Roosevelt to the Interstate Commerce Commission to succeed Marion M. Caskie, resigned.

March Steel Inventories 11.8% Above Like Month Last Year

WASHINGTON — Steel inventories dropped 0.6 per cent in value in March under those of February but were 11.8 per cent greater than in March of last year, according to the monthly survey of the Division of Business Review, Bureau of Foreign and Domestic Commerce. New orders rose 25.6 per cent in value over February, unfilled orders declined 2.4 per cent and shipments, contrasting with the upturn in other durable goods industries, showed a decrease of 2.1 per cent. All figures in the survey are on a valuation basis.

Transportation equipment inventories increased 4.3 per cent in March over February and 78.6 per cent over March of last year. Electrical machinery stocks rose 2.5 per cent and 17.2 per cent, respectively. Gains in machinery (except electrical) inventories were 0.3 per cent and 11.9 per cent, while inventories of automobiles and equipment declined 3.1 per cent in March under February but were 12.5 per cent greater than in March 1939.

Electrical Machinery Gains

The value of electrical machinery orders rose 3.9 per cent in March 1940 over February and 19.8 per cent above March of last year, while comparable gains in machinery were 8.5 per cent and 6.8 per cent. In "other durable goods" there was a loss of 3.9 per cent in March of the present year under February but an increase of 0.4 per cent over March, 1939.

Unfilled orders for electrical machinery in March, 1940, declined 0.4 per cent under February but were 55.1 per cent over March of last year. Increases in unfilled orders for machinery were 1.2 per cent and 73 per cent. In "other durable goods" there was a drop of 8.8 per cent in unfilled orders in March of the current year under February but a gain of 40.5 per cent over March, 1939.

Shipments of transportation equipment rose 13.7 per cent in March, 1940, over February and 85 per cent over March of last year. Respective gains in electrical machinery were 6.2 per cent and 23.5 per cent; in machinery, 12.3 per cent and 13.2 per cent and in automobiles and equipment, 5.7 per cent and 15.7 per cent.

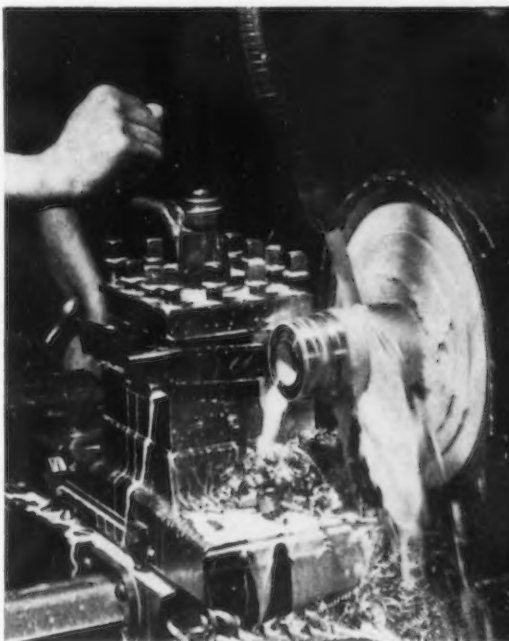
Expansion of manufacturers' inventories, a major factor in the domestic

business situation since the outbreak of the war in Europe, was definitely halted in March, it was announced.

The value of inventories held by manufacturers at the beginning of April was fractionally lower than at the beginning of March, according to

the Department's index of the value of manufacturers' inventories, which stood at 110.3 on April 1 as against 110.5 at the beginning of the previous month. (Jan. 1, 1939 — 100).

The inventory expansion which began last autumn and ended in March added over \$1,200,000,000 to the value of manufacturers' stocks. Following the commencement of hostilities in Europe, manufacturers' inventories moved upward at a substantial rate.



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better
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tool life
HOW?**

If these are problems that concern you, why not let our lubrication engineers help you solve them with the right cutting fluid? They have done that for others. They can do it for you!

One prominent screw manufacturer*, for instance, was thus able to step-up production 25%, lengthen tool life and turn out better finished work than he was able to do previously.

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City.....State.....

averaging \$300,000,000 a month in the final quarter of 1939. This expansion was a major factor both in the volume of new orders placed and in the high rate of production during this period. Although the rate of accumulation began to decline after the first of the year, almost \$350,000,000 more was added to manufacturers' inventories during the first two months of 1940. In March, however, the net change in the value of manufacturers' stocks was very slight and the stimulus pre-

viously derived from the net accumulation of inventories was withdrawn.

New Business Up 7%

March was the first month since last fall in which the volume of new business received by manufacturers failed to exceed the like month for 1939 by a substantial margin. Total new orders received by manufacturers were only one per cent greater than in March 1939. While there was some pick-up in new business in March over

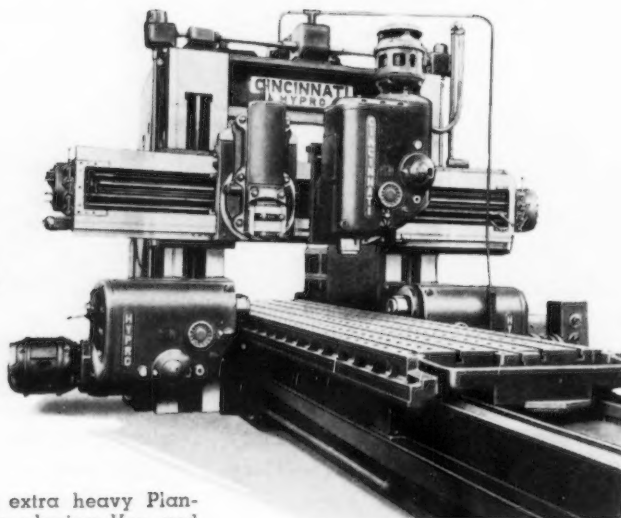
the February level, it amounted to less than 7 per cent and was hardly more than could be accounted for by the longer month and the usual spring rise in certain lines.

Manufacturers' shipments again exceeded new business booked, resulting in a further decline of 3 per cent in unfilled order backlogs. This, it was stated, indicates that the volume of new business in March was not sufficient to maintain the then current level of manufacturing production, despite the rise in orders which occurred in that month.

Cincinnati

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**Planing and
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Same Machine
on a High
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Basis**



Multiple Tools in extra heavy Planing Head used for planing Vee and Flat and rugged Milling Heads with individual 20 H.P. motors, have reduced production time over 50% on grinder beds. This is only an example of time that can be saved with a machine of this type. Machine illustrated is of entirely new design, incorporating individually driven 9½" Quill Milling Heads providing spindle speeds of 10 to 200 R.P.M. capable of handling cutters over 18" in diameter.

A wide range of planing speeds is provided to the table through separate planer motor and control. Machine can be instantly changed from milling to planing by movement of selector switch or control handle. If you are interested in placing precision milling and planing on the same machine, the new Hypro Combination Machine merits your close attention.

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Republic Asks Court Review of Wage Case

WASHINGTON—Based on a decision of April 29 by the Court of Appeals for the Second Circuit holding that the National Labor Relations Board has no authority to require an employer to reimburse work-relief projects for the wages paid by such projects to striking employees, the Republic Steel Corp. last Wednesday again petitioned the Supreme Court to review the corporation's case growing out of the little steel strike.

On April 8 the Supreme Court denied Republic's first petition for a review of a decision by the Court of Appeals for the Third Circuit which upheld the NLRB's order requiring Republic to reimburse work-relief projects for wages they paid to Republic strikers.

The Republic petition points out that the subsequent decision of the Circuit Court of Appeals for the Second Circuit, rendered in the Leviton Mfg. Co.'s NLRB case was "squarely in conflict" with the Circuit Court decision in the Republic case.

CIO Loses Elections In Cincinnati Plants

WASHINGTON—The Independent Employees Organization has been certified by the National Labor Relations Board as sole collective bargaining agency for all production and maintenance employees of the R. K. Le Blond Machine Tool Co., and the Cincinnati Electrical Tool Co., Cincinnati. Certification was the result of a run-off election in which the Independent Union defeated CIO's Amalgamated Association of Iron, Steel and Tin Workers by a vote of 293 to 229.

Employers Warned Under Fair Labor Standards Act

WASHINGTON — Col. Philip B. Fleming, wage-hour administrator, has ordered field forces functioning under the Fair Labor Standards Act to crack down on employers who fail to keep true and adequate records as required by law.

"Incomplete wage and hour records are the most serious hurdle confronting our inspectors," Colonel Fleming said. "This is true in all of the 15 regions into which the country has been divided for enforcement purposes. I have directed that employers violating the law in this respect be prosecuted."

Regulations issued under the law require listing the name of each employee, home address, hours worked each work day and each work week, hourly rates of pay, total wages paid and date of payment. The wage-hour division said that in some instances violators have falsified or destroyed records.

U. S. Awards Contract for 7000 Tons of Chromium

WASHINGTON—E. J. Lavino & Co., Philadelphia, agents for the Rhodesia Chrome Mines, Ltd., has been awarded a contract by the Procurement Division for 7000 gross tons of 48 per cent chromium ore at \$24 per ton. Delivery of the ore will be made f.o.b. cars, Philadelphia Harbor, Philadelphia, and must be completed within six months.

Higher Minimum Wage Urged for Rail Workers

WASHINGTON — A minimum wage of 36c. per hr. for employees of Class One railroads and a 33c. minimum rate for employees of shortline railroads have been recommended under the Fair Labor Standards Act by the Railroad Carrier Industry Committee.

The wage recommendation, which Wage-Hour Administrator Fleming called "one of the most important" yet made under the law, would increase railroad management costs by \$6,903,609 a year, and bring wage increases to 60,000 workers employed by Class One carriers and to 5300 employees of shortline roads. A public hearing will permit interested parties to oppose the recommendation but no date has been fixed by the administrator.

Steel Commission Set Up By Brazilian Government

WASHINGTON — Brazil's National Steel Plan Executive Commission is now officially set up in Rio de Janeiro, says a report from the office of the American Commercial Attache, Rio de Janeiro. Created by government decree, the purpose of this commission is to make technical studies for the establishment of a domestic iron and steel industry; to organize a financial plan for a national company,

with both government and private capital participating, and to construct and operate plants.

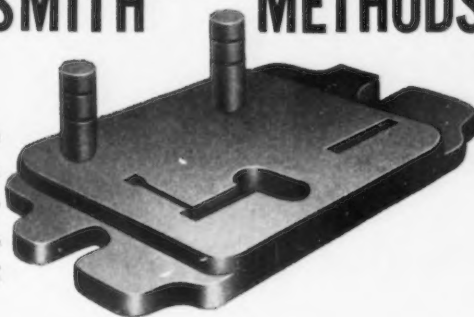
Government Orders

WASHINGTON — Government contracts for iron and steel products, as reported by the Labor Department's Public Contracts Division for the week ended May 4, totaled \$782,505. For the same period con-

STOP "BLACKSMITH" METHODS

USE A DoAll

This part 12½" long, 7¼" wide was sawed from 1⅜" cast iron on the DoAll in exactly 30 minutes. Formerly, it was drilled, chipped and filed, requiring 6 hours.



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Contour Sawing, the new DoAll process of machining, is recognized as the fastest precision method of removing metal; cuts out internal and external shapes from any metal up to 10" thick.



Does work of 3 machines. DoAll is a moderately priced, rugged, precision machine tool that replaces shaping, milling and lathe work on a large variety of jobs with enormous savings.

Used in large and small plants in 30 countries by such firms as General Electric, Ace Tool & Die, U.S. Navy, Picatinny Arsenal, Kokomo Spring, Mergenthaler Linotype, Ford, Fisher Body, John Wood Mfg. Co., Continental Scale, etc.

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Contour Machine
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tracts were reported totaling \$1,626,714 for non-ferrous metals and alloys; and \$1,476,938 for machinery. Details follow:

Iron and Steel Products

Bethlehem Steel Co., San Francisco, and Seattle, Interior, Reclamation, reinforcement bars	\$12,676
The W. H. Kiefaber Co., Dayton, Ohio, War Air Corps, hand taps	10,222
Grayson Heat Control Ltd., Lynwood, Cal., War Ordnance, bomb fuses	98,092
Pennsylvania Forge Corp., Philadelphia, War Ordnance, steel forgings	30,114
Provo Foundry and Machine Co., Provo, Utah, Interior Reclamation, piping, penstocks	23,850
Washington Iron Works, Seattle, T.V.A. boiler	13,970

M. K. Epstein Co., Springfield, Mass., Navy S&A, car type furnaces	22,632
Bolt and Nut Division, Republic Steel Corp., Cleveland, Navy S&A, bolts and nuts	9,889
Pittsburgh Screw & Bolt Corp., Pittsburgh, Navy S&A, bolts and nuts	13,717
Hayes Mfg. Corp., Grand Rapids, Mich., Navy S&A, afterbody shells	20,856
Wickwire Brothers Inc., Cortland, N. Y., Navy S&A, wire nails	Indefinite
H. Channon Co., Chicago, Navy S&A, wire nails	Indefinite
Bethlehem Steel Co., Bethlehem, Pa., Navy S&A, wire nails	Indefinite
J. K. Larkin & Co., Woodside, Long Island, Navy S&A, steel nails	Indefinite
Columbia Steel Co., San Francisco, Navy S&A, wire nails	Indefinite
Keystone Steel & Wire Co., Peoria, Ill., Navy S&A, wire nails	19,000

The Midvale Co., Washington, Navy S&A, accumulators	18,675
Breeze Corporations Inc., Newark, N. J., Navy S&A, doors, hatches	85,564
Heppenstall Co., Pittsburgh, Navy S&A, shafts and forgings	47,700
Howard Foundry Co., Chicago, Navy S&A, protecting cap assemblies	93,097
Mitchell Metal Products Inc., Cleveland, Navy S&A, extractors for cartridge cases	28,350
Crucible Steel Co. of America, New York, Navy S&A, steel bar	16,178
Pressed Steel Tank Co., West Allis, Wis., Navy S&A, blank shells	32,548
Noland Co. Inc., Washington, Navy S&A, cocks and valves	20,193
Crane Co., Washington, Navy S&A, composition unions	9,981
J. M. Tull Metal & Supply Co. Inc., Atlanta, Navy S&A, steel, manganese	9,999
Ramon A. Pla, San Juan, P. R., PRRA, steel sheets	44,860
M. Mocerua Arsuaga Inc., San Juan, P. R., PRRA, pipe and fittings	11,200
Corbin Screw Corp., American Hardware Corp., Successor, New Britain, Conn., War Ordnance, bomb fuses	29,840
Federal Screw Works, Detroit, War Ordnance, components for booster	59,795

Non-Ferrous Metals and Alloys

Walter Kidde & Co. Inc., New York City, Navy Purchasing Office, fire extinguishers	\$31,612
Federated Metals Division American Smelting & Refining Co., Baltimore, War CWS, zinc dust	10,725
Pollak Mfg. Co., Arlington, N. J., Navy S&A, powder containers	549,900
National Lead Co., Baltimore Division, Baltimore, Navy S&A, pig lead	50,534
International Nickel Co. Inc., New York City, Navy S&A, nickel, chromium alloy	21,600
Pollak Mfg. Co., Arlington, N. J., Navy S&A, aluminum containers	28,500
Pollak Mfg. Co., Arlington, N. J., Navy S&A, cartridge containers	111,998
Norris Stamping & Mfg. Co., Los Angeles, Navy S&A, cartridge containers	700,309
Wolverine Tube Co., Detroit, Navy S&A, condenser tubes	26,008
American Brass Co., Waterbury, Conn., War Ordnance, cartridge brass disks	95,526

Machinery

Hydraulic Press Mfg. Co., Mt. Giload, Ohio, War Ordnance, hydraulic press	\$23,180
Austin-Hastings Co. Inc., Cambridge, Mass., War Ordnance, surface grinder	21,825
Hires, Castner & Harris Inc., Philadelphia, National Archives, humidifying and drying machine	21,498
Foote Brothers Gear & Machine Corp., Chicago, T.V.A., operating machinery	161,775
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, War Air Corps, milling machines	36,109
Caterpillar Tractor Co., Peoria, Ill., Navy S&A, diesel engines	19,200
Henry Prentiss & Co. Inc., New York City, Navy S&A, milling and boring machine	130,887
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, Navy S&A, Milling Machines	25,684
Hayes Body Corp., Grand Rapids, Mich., Navy S&A, punching machines	22,725
The American Tool Works Co., Cincinnati, Navy S&A, engine lathe	12,677
Kearney & Trecker Corp., Milwaukee, Navy S&A, milling machine	10,699
Westinghouse Electric & Mfg. Co., Washington, Essington and East Pittsburgh, Pa., Navy S&A, hydraulic elevators	307,493
Baldwin Locomotive Works, Baldwin Southwark Division, Philadelphia, and Eddystone, Pa., Navy S&A, glue press	48,755
Cincinnati Milling Machine & Cincinnati Grinders Inc., Cincinnati, Navy S&A, milling machine	17,643
American Tool Works Co., Cincinnati, Navy S&A, engine lathes	23,806
Erie Foundry Co., Erie, Pa., Navy S&A, forging hammer	31,310
Western Gear Works, South Seattle, Navy S&A, crane machinery	282,009
Ex-Cell-O Corp., Detroit, Navy S&A, thread grinder	14,996
Northern Pump Co., Minneapolis, Navy S&A, pump units	50,406
Walworth Co., New York, and	



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As you read this... Erie Steam Hammers are forging parts for Royal Air Force bombers and pursuit ships... Erie Hammers, because the thorough-going British know that parts forged on Erie Hammers are of tougher texture... possess an extra margin of strength vital to safety... forgings as dependable as the Erie hammers which make them. Erie's new steam hammer bulletin No. 333 is yours for the asking.

The British Air Minister Sir Kingsley Wood and some of his staff inspect an Erie Hammer installation. The World's Largest Steam Hammer "Somewhere in England."

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ERIE BUILDS Dependable HAMMERS

Greensburg, Pa., Navy S&A, bronze valves	49,176
American Tool Works Co., Cincinnati, Navy S&A, engine lathe	60,713
Homestead Valve Mfg. Co., Coraopolis, Pa., Navy S&A, steel valves	16,545
Star Machinery Co., Seattle, Navy S&A, boring machine	26,751
Crane Co., Washington, D. C., Navy S&A, steel valves	33,860
McKernan-Terry Corp., Harrison, N. J., Navy S&A, winches	16,448
M. T. Davidson Co., Brooklyn, N. Y., Navy S&A, pumps	10,773

R. J. S. Pigott Elected By Measurement Society

PITTSBURGH — The American Society for Measurement and Control, 1117 Wolfendale Street, has elected these officials: president, R. J. S. Pigott, Gulf Research & Development Co.; vice-president, M. F. Behar, editor, *Instruments*; Frank C. McGough, Weirton Steel Co., treasurer; Clarke E. Fry, Westinghouse Electric & Mfg. Co.; directors, M. D. Johnson, Caterpillar Tractor Co., and J. B. Keller, Carnegie-Illinois Steel Corp.

Steel Institute Elects Five New Directors

ELECTION of five new members to the board of directors of the American Iron and Steel Institute to fill vacancies is announced by the institute.

The new directors are: Thomas R. Akin, president, Laclede Steel Co., St. Louis; Elton Hoyt II, managing partner, Pickands, Mather & Co., Cleveland; W. H. Sommer, president, Keystone Steel & Wire Co., Peoria, Ill.; John T. Whiting, president, Alan Wood Steel Co., Conshohocken, Pa.; and D. A. Williams, president, Continental Steel Corp., Kokomo, Ind.

Michigan Meeting to Study Social Effects of Machine

GRAND RAPIDS, MICH.—The social consequences of changing production methods in industry will be discussed at a triangular session of the 67th annual meeting of the National Conference of Social Work to be held at Grand Rapids, May 26 to June 1. The session on production methods will be on May 27, with Stephen DuBrul, personnel director of General Motors Corp. at Detroit, as an industrial speaker. Mary Van Vleeck, director of the Department of Industrial Studies of the Russell Sage Foundation, New York, and Harold J. Ruttenberg, of the Steel Workers Organizing Committee, Pittsburgh, will be other speakers.

Metal Trades Association Convention May 21 and 22

THE National Metal Trades Association, holding its annual convention and dinner May 21-22 at the Biltmore Hotel, New York, will hear a report by Nelson W. Pickering, president, Farrel-Birmingham Co., and an address by J. Fulton Lewis, Jr., on "Events in Washington." On Tuesday, May 21, a panel discussion on "Timely Employer-Employee Relations" will be

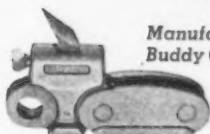
held by six industrial leaders and on Tuesday evening Governor Baldwin of Connecticut will address the annual dinner. On May 22, Carl Taylor, Milwaukee, will speak on "What Makes America a Great Country." A. S. Redway, Farrel-Birmingham Co., will discuss "Putting Job Rating to Work" and "What The Engineer Needs to Know About Management" will be discussed by H. M. Hubbard, Harris-Seybold-Potter Co. Homer D. Sayre is commissioner of the association.

"20% Saving in material cost realized by using FORGINGS



For Differential Unit," so states manufacturer of Oliver Motor Grader Power Units, which include this conventional type differential made in two halves which are forged to provide adequate safety factors.

—Excerpt from "Drop Forging Topics"



Manufacture, of Little Buddy Coal Cutter says:

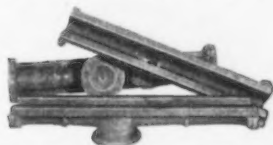
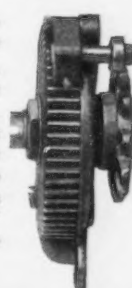
"We have realized approximately 20% more pieces machined per tool grind since forgings are used. This economy, of course, results in uniformity of the material in the forgings."

—Excerpt from "Drop Forging Topics."

Manufacturer of Automatic Coal Burners says:

Greater production economies do result from our use of forged pawls . . . We would estimate that we realize a saving of at least 50% through the use of forgings for this particular purpose . . ."

—Excerpt from "Drop Forging Topics."



The Cleveland Rock Drill Co. says: "We have been using forged guide shells in our equipment for several years with very satisfactory results. These guide shells were formerly made from castings, and considerable breakage occurred at the center boss at the fillet. This condition has been entirely eliminated since using forgings."

—Excerpt from "Drop Forging Topics."

THERE ARE NO SUBSTITUTES FOR FORGINGS

USE MORE FORGINGS AND OBTAIN:

1. STRENGTH
2. UNIFORMITY OF PHYSICAL PROPERTIES
3. WEIGHT REDUCTION
4. LOWER MACHINING COSTS
5. SAFETY
6. ENDURANCE

"Drop Forging Topics" is sent free to engineers, designers, metallurgists, production and management executives. If you are not receiving it, send us your name today

DROP FORGING ASSOCIATION

605 HANNA BUILDING • CLEVELAND, OHIO

Steel Warehouse Convention May 21-22

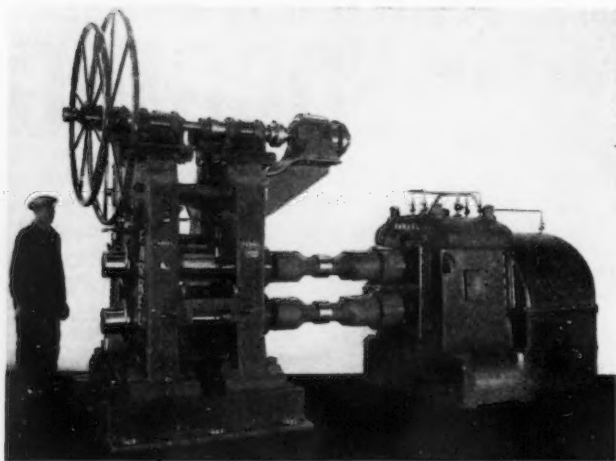
CLEVELAND—The program of the 31st annual convention of the American Steel Warehouse Association, Inc., will be focused upon basic factors of steel merchandising, states Walter S. Doxsey, executive secretary. The convention will be held at Hotel Plaza, New York, May 21 and 22:

With about 50 per cent of its invoices amounting to less than \$10 each, warehouse distribution of steel is analogous to retail merchandising. Lessons the steel distributor can learn from the retail trade, therefore, will be discussed by a nationally known retailing expert. The importance of costs in handling small orders will be presented by a past president of the American Institute of Accountants who is a specialist in accounting principles and procedures.

The association's committee on the cost of operating steel warehouses will present the results of its studies of data supplied by member companies. The association's counsel will outline the effects of federal and state legislation upon business management.

Ladies attending the convention will be entertained at the World's Fair, and at a dance and floor show which will follow the banquet on Wednesday evening. Early registrations point to the largest attendance in the history of the association.

FARREL ROLLING MILL PERFORMS COMPLETE RANGE OF ROLLING OPERATIONS ON WIDE VARIETY OF METALS



This 16" x 16" two-high rolling mill is an example of Farrel engineering to fit the job. In this case the job was the rolling of a wide variety of metals, including copper, brass, bronze, silver, nickel, silver, monel metal, bi-metals and semi-precious metals. Production requirements dictated a mill that could be used for all rolling operations from breaking-down to finishing, and one of heavy, rugged construction to handle large reductions.

The mill has forged, heat-treated, alloy steel rolls . . . heavy Meehanite housings . . . force-feed, grease-lubricated, plain, bronze bearings . . . combination double-handwheel screwdown with motor drive for rapid approximate positioning of the top roll . . . hydraulic top-roll counterbalance

. . . Meehanite delivery and feed tables . . . adjustable side guides on feed table . . . a wiper on each roll . . . and a safety bar tripping device for quick stopping in an emergency.

The reduction gear drive and pinion stand are combined in an integral unit, with Farrel-Sykes continuous tooth herringbone gears and mill pinions mounted in anti-friction roller bearings. Gears and bearings are force-feed lubricated. A Farrel Gearflex Coupling connects the motor and drive and universal spindles connect the pinion stand with the mill.

Designing and building mills such as this to meet particular requirements is a specialty of Farrel-Birmingham. If you have a special mill problem our engineers will be glad to consult with you.

FARREL FARREL-BIRMINGHAM COMPANY, Inc.
ANSONIA, CONN.
New York • Buffalo • Pittsburgh • Akron • Chicago • Los Angeles

Mechanical Engineers Visit Norton Plant

MEMBERS and guests attending the spring meeting of the American Society of Mechanical Engineers, held in Worcester, Mass., May 1-3, visited the plant of the Norton Co. on the afternoon of May 1.

Three different tours were available for those interested in the manufacture of grinding wheels, in the production of grinding machines, and in the new Norton power plant, respectively. All three tours ended up at the Norton Field House where a special exhibit featured many items of laboratory equipment.

In the machine division the visitors inspected various steps in the production of grinding, lapping and super-finishing machines and witnessed operating demonstrations of the precision and surface finish obtainable on Norton machines of most recent design. This exhibit also included application of the profilometer and other electrical measuring machines for comparing surface finishes.

The company's publicity department had on view the attractive display prepared for the forthcoming International Petroleum Exposition, to be held at Tulsa. An exhibit of safety equipment used throughout the Norton plants was also to be seen.

Scrap Institute Meets July 22-23 at Buffalo

JULY 22-23 are the dates chosen for the mid-year meeting of the Institute of Scrap Iron and Steel Inc. at Buffalo. Headquarters will be at the Hotel Statler. Business sessions will be held both mornings. Nathan H. Jacobs, of Buffalo House Wrecking & Salvage Co., president, western New York chapter, is general chairman of the convention committee.

Triple Mill Supply Convention Elects

AT the Triple Mill Supply Convention held recently in Dallas, Tex., the Southern Supply & Machinery Distributors' Association, Inc., elected J. M. Bates, Birmingham, president; J. B. Crimmins, Chattanooga, Tenn., and Howard Schramm, Mobile, Ala., vice-presidents, and Alvin M. Smith, Richmond, Va., secretary-treasurer. The National Supply & Machinery Distributors' Association elected A. R. Smith, Detroit, president; Andrew G. Carey, Baltimore, T. W. Carlisle, Cleveland and H. V. Waterman, Denver, vice-presidents; George A. Fernley, Philadelphia, advisory secretary, and Henry R. Rinehart, Philadelphia, secretary-treasurer. H. K. Clark, Worcester, Mass., was elected president of the American Supply & Machinery Manufacturers' Association which chose as vice-presidents, R. G. Thompson, Saginaw, Mich., and H. P. Ladds, Cleveland, as secretary-manager, R. Kennedy Hanson, Pittsburgh, and treasurer, J. S. Disston, Jr., Philadelphia.

Purchasing Agents to Hear Clark, Hook, Zimmerman

CHARLES R. HOOK, president, American Rolling Mill Co., Norris J. Clark, vice-president, Republic Steel Corp., and R. E. Zimmerman, vice-president, U. S. Steel Corp., are listed as speakers at the 25th annual international convention of the National Association of Purchasing Agents, starting June 3 in Cincinnati.

Two thousand purchasing agents from all sections of the United States and Canada are expected to attend a four-day series of business conferences. Mr. Hook's address will be on "Where Is American Business and How Did It Get There?" Louis Johnson, assistant secretary of war, will speak on "The United States Industrial Mobilization Plan for War." The convention will be held at the Netherland Plaza Hotel.

Chicago Bridge Gets \$184,500 Contract

WASHINGTON—The Bureau of Reclamation has awarded a \$184,500 contract to the Chicago Bridge & Iron Co., Chicago, for supplying and erecting four welded plate steel penstock pipes for installation at the Parker Power Plant, Parker Dam on the Colorado River near Earp, Cal.

Baltimore Steel Club Headed by H. R. Dorney

H. RODGERS DORNEY, of Jones & Laughlin Steel Corp., was chosen president of the Baltimore Steel Club, Baltimore, and James Aldridge, of Bartlett-Hayward Co., was elected vice-president, at the club's May 3 meeting when candidates for offices in the organization made campaign speeches. A parade of members

carrying election banners was headed by Charles Duvall, of the Maryland Bolt & Nut Co.

Secretary and treasurer of the organization is Joseph Hagger, of Charles T. Brandt, Inc., while directors are Henry A. Lowrey, Seaboard Steel & Iron Co., Charles W. Test, of Youngstown Sheet & Tube Co., Leonard F. Olt of Crown Cork & Seal Co., and Harold K. Dell, of John J. Greer & Co.



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Tinnerman Products To Enlarge its Plant

CLEVELAND—Construction is expected to be started immediately upon a new plant addition for Tinnerman Products, Inc., 2038 Fulton Road, which will add approximately 12,000 sq. ft. of floor space. The company manufactures speed nuts.

More than 1,000,000 speed nuts are being produced daily, and with the added manufacturing facilities, capacity will be stepped up to around 3,000,000 units per day. The new addition

will be of brick and steel construction two stories high.

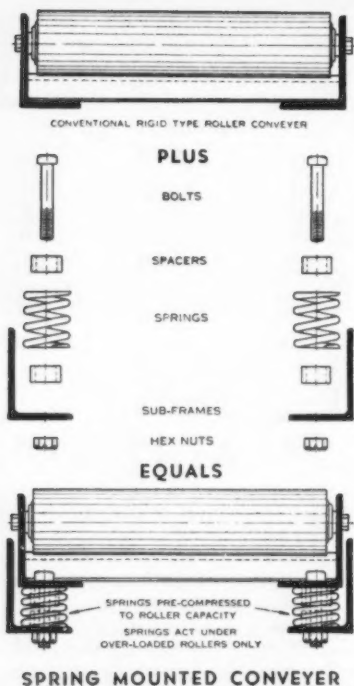
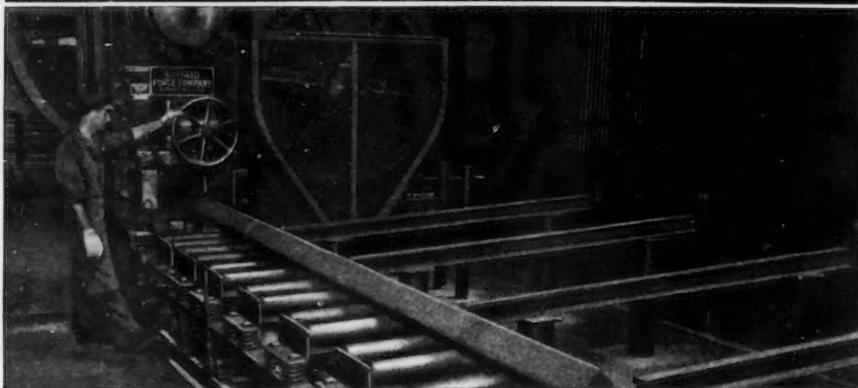
More than 500 applications, principally in the assembly of automobiles, refrigerators, stoves and radios have been developed for speed nuts. Originally and for many years the company engaged in the manufacture of stoves and ranges, but early this year concentration upon the fasteners, which are made of spring steel, was decided upon. Albert T. Tinnerman is president and George A. Tinnerman is general manager of the company.

Detroit Stamping Co. Constructs New Plant

CONSTRUCTION of a complete new plant for the Detroit Stamping Co. on Midland Avenue, Highland Park, Mich., was to be started this week by the Austin Co., who designed the structure. It is scheduled for completion early this summer. The building will represent an investment of \$80,000 and will have an area of approximately 35,000 sq. ft.

N. A. Woodworth Co., aviation parts manufacturer, 1501 Jarvis Avenue, Ferndale, Mich., has awarded Austin Co. a contract for a new machine shop.

MATHEWS SPRING MOUNTED CONVEYERS



CUT MAINTENANCE COSTS

THE principle is simple; the roller axles are rigidly locked in the frame as in the conventional "rigid type" construction, but the conveyor frame which retains the rollers is carried on pre-compressed coil springs. The springs are held in compression equal to the rated safe load of each roller. Under impact conditions or excessive loads the springs absorb the overload.

This construction represents the greatest improvement in roller conveyor in many years. Its application will reduce maintenance costs by prolonging the life of the equipment. When conditions are severe, "spring mounted" is the practical conveyor construction for the job.

Capacities from 150 lbs. to 8000 lbs. per roller available.

Ask for Illustrated Folder

MATHEWS CONVEYER COMPANY
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CONTINUOUS FLOW PRINCIPLE OF HANDLING MATERIALS

Rehearing of Steckel Case May be Sought

THE United States Steel Corp. next week is expected to petition the United States Circuit Court of Appeals at Philadelphia for a rehearing in the case of the Cold Metal Process Co. against the Carnegie-Illinois Steel Corp. and the United States Steel Corp. On June 15 the circuit court upheld the validity of patents issued to Abram F. Steckel for the cold rolling process embodied in the Steckel mill. These patents were assigned by Mr. Steckel to the Cold Metal Process Co. of Youngstown, Ohio, and were declared infringed by the court.

(Full details of the court's decision at that time may be found on page 78F, June 22 issue of THE IRON AGE.)

Conference Board Plans Reconstruction Program

MAJOR elements of "a reconstruction program for American enterprise" will be discussed May 22 when the National Industrial Conference Board holds its 24th annual meeting at the Waldorf-Astoria hotel, New York.

Round-table discussions on improvement of employer-employee relations will be carried on by A. T. Brown, executive vice-president, Caterpillar Tractor Co., William M. Leiserson, NLRB member, Elliott Dunlap Smith, Yale University, Harold B. Bergen, McKinsey & Co., and George M. Harrison, vice-president, American Federation of Labor. The general session, with Virgil Jordan, president, the Conference Board, as chairman, will hear Senator O'Mahoney, TNEC chairman, Alfred P. Sloan, Jr., chairman, General Motors Corp., and W. L. Batt, president, SKF Industries, Inc.

J. & L. Locomotives Each Will Carry Extra Man

PITTSBURGH—The Monongahela Connecting Railroad, subsidiary of the Jones & Laughlin Steel Corp., will use a fireman as a helper on each of its three diesel locomotives which are used in the transfer of materials to and from main trunk line railroads, as a result of a compromise agreement reached last week with the Brotherhood of Locomotive Firemen and Enginemen. This agreement settled a week-old strike, in which the union had demanded the use of firemen as helpers on all of the company's eight diesel engines. Those diesels which will not connect to the main trunk line railroads will carry one operator as heretofore.

Theater Added to Fair Exhibit of U. S. Steel

AN air-conditioned moving picture theater has been added to the United States Steel Corp. subsidiaries exhibit at the New York World's Fair, and "Men Make Steel," a technicolor film, will be shown at frequent intervals. "Men Make Steel" was filmed by a Hollywood crew. The actors, however, are the men who make steel and the scenes are scenes of actual steel operations photographed at the ore mines and inside the mills.

The picture, in addition to telling a story of steelmaking, presents scenes of beauty as the technicolor camera records the brilliant colors peculiar to flashing, molten metal. The narrative accompanying "Men Make Steel" is presented by Edwin C. Hill.

Awards to be Given for Most Beautiful Bridges

PLANs for the 12th annual award for the most beautiful bridge of steel built during the past year have been announced by the American Institute of Steel Construction. Builders and owners of bridges erected last year are invited to make entries in this competition not later than June 1. The bridges will be selected from photographs of steel bridges built during 1939. The following data should accompany the photographs that are submitted: Name of bridge, location, total cost, engineer, fabricator, owner, date completed, date opened to traffic, span length, roadway width.

The institute awards four stainless steel plaques to the four bridges judged the most beautiful in their class.

Sheet & Tube to Honor Veteran Employees

ONE thousand and eighty Youngstown Sheet & Tube Co. employees with more than 25 years' service with that company in the Youngstown district will receive 14-karat gold service emblems on Saturday, May 18, when an "Old Timers" celebration will be held.

Included among the veteran employees is Frank Purnell, president, with 37 years' service, and R. M. Welch,

assistant to the president, with 38 years. Many of the 1080 employees, who have averaged 29.7 years with Youngstown Sheet & Tube, are workmen known personally by the late James A. Campbell, founder of the company. Four of the employees are women, all telephone operators. One of every 14 workmen in Sheet & Tube's Youngstown plants has been with the company more than 29 years. Charles Goers, of the Brier Hill works, has the longest service record—56 years.

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No metallic dusts, no corrosive fumes, no moisture can attack the windings in a HOWELL Type K.

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Court Approves Follansbee Plan

PITTSBURGH—Judge Robert M. Gibson of the U. S. Circuit Court last week signed an order authorizing reorganization of the Follansbee Brothers Co. in a plan by which all assets will be transferred to Follansbee Steel Corp.

Under the plan the corporation has raised about \$2,500,000 of new money

secured by (1) a loan of \$2,100,000 from the Union National Bank of Pittsburgh, First National Bank of Pittsburgh, and National City Bank of New York (with deferred participation by the RFC up to \$1,850,000) and (2) private sale of common stock of Follansbee Steel Corp. at \$15 a share.

Bondholders of the older company will receive for each \$1,000 bond 10 shares of new preferred stock and 13½ shares of common stock. Two and one-half shares of new common

stock will be issued in exchange for each share of the old preferred, and ¼ share of new common will be issued for each share of old common.

The company will spend about \$1,270,000 for new equipment at its Follansbee, W. Va., plant where modern cold-reducing mills and auxiliary equipment will be installed. Open-hearth furnaces at the Toronto, Ohio, plants will be operated and long-term contracts to assure supplies of raw materials will be made. The new equipment, according to John Follansbee, chairman of the board, will be ready for operation by early fall and principal products will continue to be tin plate, electrical steel sheets, black sheets and metal roofing.

W. T. Brownscombe is president of the new company and Edgar Masters is secretary and treasurer.



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"Salem" Rotary Hearth Furnaces have their own special advantages, too:—

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- (2) The Rotary Hearth offers fuel economy due to small doors and compared with batch type furnaces.
- (3) With the Rotary Hearth, steel is kept moving—never left standing long under direct flame.
- (4) The Rotary Hearth offers more ideal loading and heating conditions.

Upper right—Controlled oil-fired Salem Rotary Hearth Furnace used primarily for high speed steel billets up to 9½" square by 50" long.

Upper left—"Salem" Rotary Hearth fuel fired furnace for hardening skate blades and bicycle wheel races. This furnace employs balanced hearth trays of alloy steel which tip forward permitting discharge of material into either water quench or oil quench.

Second from top left—"Salem" Rotary Hearth Furnace 14 ft. dia. for hardening coil springs. operates at around 1500 deg. Fahr. Fuel oil fired, provides uniform temperature throughout for heat treating.

Second from bottom—Rotary Hearth Furnace 20 ft. in dia. used for heat treating rail splice plates, furnace capable of operation at 2000 deg. Fahr. when desired.

Bottom—Fuel fired "Salem" Rotary Hearth Furnace for heating and drawing shell forgings.

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Porcelain Enamel "Holds Bag," P. B. McBride Says

P. B. McBRIDE, president, Porcelain Metals Corp., Louisville, and president of the Porcelain Enamel Institute, told members of the Eastern Enamelers' Club, meeting in Baltimore on May 4, that the industry lacked aggressive sales ideas. In a talk entitled, "Tricks in Snipe Hunting," he described how porcelain enamel is "holding the bag" while other materials and finishes out-distance the industry in promotional methods.

The porcelain enameling industry has been so busy with technical developments that it has had little time for the study of marketing methods, he said. New ideas and new approaches are necessary. Price reductions and improved technical products are not sufficient, according to Mr. McBride.

Bopp Steel Co. Expands At Dearborn, Mich.

CLEVELAND—Contracts for the design and construction of a 28,000 sq. ft. addition to the Bopp Steel Co. plant at 7951 Maple Street, Dearborn, Mich., have been awarded to The Austin Co. Increased demands upon its facilities for cold rolling of strip steel for automotive and kindred industries are responsible for the expansion which will involve the investment of approximately \$100,000. It will include extensions of the pickling and annealing buildings and construction of a mill building addition 160 ft. x 105 ft.

Welding Cost Calculator Issued by Champion Rivet

CLEVELAND—The Champion Rivet Co. has prepared a pocket size calculator of welding costs in the form of a slide rule. This instrument is unusual in that it appears to be the first attempt to display in chart form a set of welding cost standards which can serve as a guide to engineers and plant officials on their production welding where a definite and normal procedure is being followed. It is being distributed through all the sales offices of the company at a nominal charge.

Westinghouse Salaried Employees Win Election

PITTSBURGH—By a vote of 441 to 78, salary production employees, inspectors and inspectors' stenographers recently chose the Association of Westinghouse Salaried Employees as their bargaining agent at a NLRB election held at the East Pittsburgh plant of Westinghouse Electric & Mfg. Co. Power house employees also chose the association by a vote of 19 to 1.

Scrap Consumption Declines in April

DOMESTIC consumption of iron and steel scrap declined in April for the fifth consecutive month. April consumption is estimated by the Institute of Scrap Iron and Steel Inc., at 2,753,000 gross tons, compared with 2,932,000 tons in March, and 2,317,000 tons in April, 1939.

However, scrap consumption for the first four months, at 12,514,000 tons, is one-third larger than in the corresponding period of 1939, when 9,759,000 tons were melted.

Highland Iron & Steel Organized at Terre Haute

CHICAGO—The former Highland Iron & Steel division of the American Chain & Cable Co., Inc., which has been operated by the latter company as a subsidiary for 19 years, is now owned and will be operated by Highland Iron & Steel, Inc. Following the recent decision of the American Chain & Cable Co. to discontinue operations at this plant, the mill was shut down. The local chamber of commerce and citizens of Terre Haute formed the new organization.

Production under the new owner-

ship began on May 8, with no change in the finished product, consisting of various grades of wrought iron and steel bars, shapes and special sections.

Officers of the new company, all of whom were connected with the old organization, are as follows: William M. Myers, chairman; Chester L. Jones, president; R. R. Schoonover, vice-president and general manager; William A. Sills, treasurer; and J. J. Cassidy, secretary and superintendent. Mr. Schoonover will handle all sales.

Hearing Scheduled On Pay for Overtime

WASHINGTON—The Labor Department's wage-hour division has called a public hearing for June 3 to solicit proposals from industry for redefining the terms "executive," and clarifying the status of persons engaged in "administrative" and "professional" capacities who are exempt from the overtime pay provisions of the Fair Labor Standards Act.

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... PERSONALS ...

LAWRENCE V. NAGLE, who has been district sales manager of the Detroit area for the Udylyte Corp., Detroit, since 1937, has been elected a vice-president. He will continue to direct sales in the Detroit district. Mr. Nagle, who was graduated from the commerce and finance department of the University of Detroit in 1926, joined the Udylyte Corp. in 1932 after having been associated with several companies in a sales capacity.

GEORGE K. HERZOG, of the Electro-Metallurgical Co., New York, has been added to the board of directors of Udylyte.

♦ ♦ ♦

S. W. GIBB, since 1931 assistant sales manager of the materials handling division of the Yale & Towne Mfg. Co., Philadelphia, has been promoted to the position of general sales manager of the Philadelphia division, succeeding JAMES C. MORGAN, who, as announced recently, has been made general manager of all Philadelphia operations.

Mr. Gibb joined the company in 1920 as Pittsburgh district sales manager. Nine years later he was promoted to Pacific Coast sales manager, with headquarters in California and in 1931 was transferred to Philadelphia as assistant sales manager for the entire materials handling division.

♦ ♦ ♦

A. S. RAIRDEN, for the past seven years rope engineer, functioning as contact between the sales and production departments of the Wickwire Spencer Steel Co., New York, has been made wire rope sales manager. He has been identified with the wire rope industry for 20 years. A graduate of Massachusetts Institute of Technology with a B.S. degree in metallurgical and mining engineering, he went first with the Carnegie Steel Co., in the blast furnace department and later was transferred to the American Steel & Wire Co. as wire rope mill superintendent. He has been active in wire rope standardization work. For a time he was identified with the American Cable Co. and Hazard Wire Rope Co. as chief engineer and assistant to the vice-president in charge of sales.

E. C. STOUT has resumed his duties as sales manager of the Eastern district after completing a special executive assignment for the Wickwire Spencer Steel Co. He will make his

headquarters in the general offices of the company in New York.

♦ ♦ ♦

H. H. WHITTINGHAM, vice-president in charge of engineering of the Norge division of Borg Warner Corp., Detroit, has been made vice-president and assistant general manager. He has been identified with the automotive and accessory fields since 1919. He gained initial production experience in the forge plant of Buick after his graduation from the University of Michigan. He was later production manager for the Canadian products division of General Motors of Canada and in 1923 took a similar post with the Detroit Gear & Machine Co. He has been identified with Norge since 1927.

♦ ♦ ♦

JOHN D. THOMPSON, formerly assistant to the vice-president of the Stanley Works, Bridgeport, Conn., has been appointed works manager of John A. Roebling's Sons Co., Trenton, N. J.

Mr. Thompson was graduated from Yale University in the class of 1925. He assumed his new duties on May 1.

♦ ♦ ♦

PAUL KLOTSCH, automotive and aviation engineer, was appointed chief engineer of the automobile division of the Crosley Corp., Cincinnati, last week. For the past five years Mr.

Klotsch has been with the Briggs Mfg. Co., Detroit, in the experimental engineering department and is widely known for his outstanding achievements in the design and development of airplanes and automobiles.

♦ ♦ ♦

WILLIAM TAGGART, who has been associated with the Steel & Tube division of the Timken Roller Bearing Co., Canton, Ohio, since 1928, has been appointed manager of tube sales. Prior to that he was employed by Republic Steel Corp.

♦ ♦ ♦

W. B. COULLIE, formerly assistant to the president, and general sales manager of Harbison-Walker Refractories Co., Pittsburgh, has been elected a vice-president. He has been identified with the sales division of the company for the past 34 years.

H. S. ROBERTSON, formerly an assistant general sales manager, has been appointed general sales manager.

♦ ♦ ♦

F. A. OLMSTEAD, for the past 23 years connected with the Hodel Chain Co., 18 years of which were spent in



S. W. GIBB, general sales manager of the Philadelphia division of Yale & Towne Mfg. Co.



LAWRENCE V. NAGLE, new vice-president of the Udylyte Corp.

charge of manufacturing operations and the last five in sales, has joined the Cleveland office of the Youngstown Sheet & Tube Co., in a sales capacity.

♦ ♦ ♦

J. A. ST. CLAIR, who has been associated with the E. C. Atkins & Co.,

Indianapolis, since 1901, has been made chief sales engineer of the industrial division. He started with the company as a shipping clerk and later was promoted to the production department. For the past several years he has worked as engineer in the engineering department and had charge of the service department.

♦ ♦ ♦

N. R. MEHLER has been appointed manager of coated product sales and specialties, Sharon Steel Corp., Sharon, Pa. R. E. PETERSON has been made assistant sales manager in Detroit and R. C. GRANT has been transferred from Toledo to Rochester. NORBERT CONNORS has been transferred from Philadelphia to New York; LAWRENCE BRODERICK has been transferred from Detroit to New York;



A. S. RAIRDEN, new wire rope sales manager of Wickwire Spencer Steel Co.

JOSEPH KITTREDGE, JR., who was in the sales department, will now specialize in development duties in the operating department and W. J. THOMAS will now head up sales of stock material.

♦ ♦ ♦

CHARLES G. MCCABE has been added to the technical staff of Battelle Memorial Institute, Columbus. He is to assist in work being undertaken at Battelle on the chemistry of the open hearth steel process. Mr. McCabe attended the University of Cincinnati and has had 10 years of open hearth experience with the American Rolling Mill Co., Middletown, Ohio.

FRANK B. THACHER, assistant general manager of Interlake Iron Corp., Chicago, has resigned.

♦ ♦ ♦

JAMES C. STEWART, president of James Stewart & Co., New York, has been elected chairman of the board. HARRY D. WATTS, formerly executive vice-president, has been made president, and ROGER PEABODY, vice-president, has been named a director.



H. H. WHITTINGHAM, vice-president and assistant general manager of Norge division of Borg Warner Corp.

RUSSELL POE, who has been assistant purchasing agent of the West Penn Power Co., Pittsburgh, since 1916, has been appointed purchasing agent of the West Penn System. D. E. WINSLOW succeeds Mr. Poe as assistant purchasing agent.

♦ ♦ ♦

THOMAS C. JENKINS, of Johannesburg, South Africa, is scheduled to arrive in New York shortly to establish himself as manufacturers' agent for South Africa. He is a graduate engineer and plans to represent American and Canadian manufacturers of drill and tool steels, electric motors, tools, scientific instruments and electrical appliances and office machines. While in this country he will make his headquarters with the Wilbur B. Driver Co., Newark, N. J.

♦ ♦ ♦

ALBERT KELLNER, export manager of the Porcelain Enamel & Mfg. Co.,



PAUL KLOTSCH, chief engineer of the automobile division of Crosley Corp.

Baltimore, has returned to this country after an extended business trip to South America.

♦ ♦ ♦

MYRON T. HERREID has been elected vice-president of the Koppers Co., Pittsburgh, in charge of the Minnesota division, succeeding E. L. SMITH, who has temporarily withdrawn from active management of the Minnesota plant.

♦ ♦ ♦

FRED H. CLAUSEN, former vice-president of the United States Chamber of Commerce and head of the Van Brunt Mfg. Co., Horicon, Wis., has announced his candidacy for United States Senator from Wisconsin on the Republican ticket. He has held various public offices in his home city and county and is widely known for his work as director and president of the Wisconsin Manufacturers' Association.

♦ ♦ ♦

A. C. ANDERSON and A. G. HANSEN were honored recently as the first recipients of the Gisholt diamond service pin denoting a half century of activity with the Gisholt Machine Co., Madison, Wis.

♦ ♦ ♦

CLIFFORD J. LEISY, since 1937 project engineer for the Glenn L. Martin Co., Baltimore, has been made chief project engineer for the Vega Airplane Co., Burbank, Cal. He is a graduate of Case School of Applied Science, and joined the Martin company in 1919 as a blueprint boy.

... OBITUARY ...

WILLIAM R. MITCHELL, executive vice-president of the National Acme Co., Cleveland, died at his home in Cleveland Heights on May 8 after a long illness. He was 62 years old.

He became associated with the company in 1902 and in term of service was its oldest employee. He was made superintendent of the product division in 1912, supervising plans and construction of the present Coit Road plant of the company. He was later general superintendent and during the 20's was for three years manager of the Detroit sales division. He returned to Cleveland as vice-president and in 1933 was made executive vice-president. He was active in community affairs and was a member of the Cleveland Chamber of Commerce and served as captain in the Cleveland Community Chest Campaigns.

♦ ♦ ♦

NILS CHAPMAN, treasurer and chairman of the executive committee of Continental Steel Corp., Kokomo, Ind., died on April 25.

♦ ♦ ♦

SAMUEL WILEY WAKEMAN, vice-president of Bethlehem Steel Corp. in charge of the corporation's shipbuilding activities, died in St. Luke's Hospital in New York of a heart attack on May 8, aged 64 years. After his graduation from Cornell University in 1899, he became associated with the



THE late William R. Mitchell, executive vice-president of the National Acme Co.

Newport News Shipbuilding & Drydock Corp. From 1901 to 1915 he was identified with the New York Shipbuilding Co., which he left to join the Bethlehem Shipbuilding Co. at Fore River, Mass., as general superintendent. Two years later he was made general manager. In 1926 he was appointed vice-president in charge of the company's East Coast plants. He had been vice-president in charge of the

steel company's entire shipbuilding operations since 1932.

♦ ♦ ♦

GEORGE H. SHEFFERLY, president and general manager of Michigan Engine Valve Co., with which he had been identified for 30 years, died May 7 at Detroit. He was 69 years old.

♦ ♦ ♦

JAMES WILBUR WATSON, 50 years old, transportation manager for the Republic Steel Corp. plant at Monroe, Mich., was buried May 7 at Newton Falls, Ohio.

♦ ♦ ♦

J. E. HAMILTON, founder of the Hamilton Mfg. Co., Two Rivers, Wis., and chairman of the board of the Aluminum Goods Mfg. Co. of that city and Manitowoc, Wis., died May 7 at Pasadena, Cal., where he has lived for the past four years since retiring from the chairmanship of the board of the Hamilton company. He was mayor of Two Rivers from 1893 to 1895 and it was through his philanthropy that the Hamilton community buildings, valued at more than \$250,000 became a part of that city. He was reelected chairman of the Aluminum Goods board early this year. He was 88 years old.

♦ ♦ ♦

RALPH S. GILDART, 56, for 18 years advertising manager of General Fireproofing Co., Youngstown, died at his home near North Lima, Ohio, May 8, aged 56 years.

Monthly Shipments of Finished Steel Products by United States Steel Corp.—Net Tons

SHIPMENTS of finished steel products by subsidiary companies of United States Steel Corp. for April totaled 907,904 net tons.

The April (30 days) shipments

compare with 931,905 net tons in March (31 days) a decrease of 24,001 net tons, and with 771,752 net tons in the corresponding month in April, 1939, an increase of 136,152 net tons.

For 1940 to date, shipments were 3,994,657 net tons compared with 3,235,153 net tons in the comparable period of 1939, an increase of 759,504 net tons.

Month	1936		1937		1938		1939		1940	
	Shipments	Per Cent of Capacity*	Shipments	Per Cent of Capacity*	Shipments	Per Cent of Capacity*	Shipments	Per Cent of Capacity*	Shipments	Per Cent of Capacity*
January	795,214	44.8	1,268,403	75.4	570,264	33.7	870,866	51.8	1,145,592	69.8
February	747,375	45.3	1,252,845	82.5	522,395	35.5	747,427	49.3	1,009,256	65.8
March	863,946	50.5	1,563,113	92.7	627,047	37.2	845,108	50.4	931,905	56.8
April	1,080,667	63.2	1,485,231	91.0	550,551	33.7	771,752	47.5	907,904	57.1
May	1,087,395	63.4	1,443,477	85.5	509,811	30.2	795,689	47.4		
June	978,030	57.1	1,405,078	85.8	524,994	32.1	607,562	49.7		
July	1,050,085	61.3	1,315,353	77.9	484,611	28.8	745,364	44.5		
August	1,019,882	59.6	1,225,907	72.6	615,521	36.3	885,636	52.7		
September	1,060,708	62.0	1,161,113	71.1	635,645	37.5	1,086,683	66.9		
October	1,108,973	62.6	875,972	52.0	730,312	43.1	1,345,855	79.9		
November	974,292	59.2	648,727	39.7	749,328	45.6	1,406,205	86.1		
December	1,178,598	68.8	539,553	32.1	765,868	45.2	1,443,969	85.8		
Yearly adjustment..	(—) 40,163	...	(—) 87,106	...	(+) 29,159	...	(—) 44,865	...		
Total for year...	11,905,002	58.2	14,097,666	70.4	7,315,506	36.7	11,707,251	59.4		

*Rolled and finished steel capacity.

The above table has been revised to conform with the practice of reporting shipments on a net ton basis inaugurated by the corporation in January, 1940. Previously, monthly shipments were reported as "tons," which included both net and gross tons on an unadjusted basis.

Spring Convention of Machine Tool Dealers

THE Associated Machine Tool Dealers of America held its spring convention meeting on Monday, Tuesday and Wednesday of this week at the Hotel Claridge, Atlantic City. Registrations reached nearly a hundred with additional guests attending the special features.

Preceded by a meeting of the executive committee on Sunday, the program opened Monday morning in a general session presided over by John Sauer, Jr., president of the association and secretary-treasurer of the Peninsular Machinery Co. of Detroit. Following Mr. Sauer's opening address and a paper on "Taxes" by Advisory Secretary George A. Fernley, the members and guests were presented with an interesting story on the "Production of Interchangeable Precision Parts" as applied to the making of Hamilton watches and with motion picture and stereopticon views detailing the methods of artillery shell production at the Frankford Arsenal. The latter feature was delivered by Col. L. H. Campbell, U. S. A. Ordnance Department, who is responsible for many of the production and handling improvements that have been effected.

Afternoon on Monday was devoted to a golf tournament after which the



JOHN SAUER, JR., President of the Associated Machine Tool Dealers of America.

guests and members assembled for a reception and banquet. They were addressed by Burnham Finney, editor of *American Machinist*, who dealt with the industrial problems that would

arise after the termination of the war and by Commander H. M. Scull, U. S. N., who spoke on "Navy Procedure in Machine Tool Purchase." Dr. Allen A. Stockdale, of the National Association of Manufacturers, also delivered an address at this session on "Free Enterprise in America."

The Tuesday morning general session featured four addresses as follows:

"What to Sell When Factories Are Loaded and Deliveries Are Bad," by F. W. Schiefer, F. W. Schiefer Machinery Co., Rochester, N. Y.; "How the Machine Tool Market Is Affected by the Airplane Industry Activity," by D. N. MacConel, Machinery Sales Co., Los Angeles; "Special Ordnance Machine Tools," by Tell Berna, General Manager, National Machine Tool Builders' Association, Cleveland, and "The Machine Tool Industry Under Pressure," by John E. Lovely, President, National Machine Tool Builders' Association, Springfield, Vermont.

Tuesday afternoon was devoted to medal match play at the Northfield Country Club and in the evening there was an informal dinner and entertainment in the main dining room of the Claridge.

On Wednesday there was an inspection trip through Frankford Arsenal for the men and visits to historic spots in Philadelphia for the ladies.

SWOC Says 490 Contracts Have Union Shop, Sole Agent Clauses

CHICAGO—Approximately 850 delegates are attending the second convention of the Steel Workers' Organizing Committee being held at the Morrison Hotel here this week. According to Philip Murray, chairman of the SWOC, 654 steel manufacturing, processing and fabricating companies had contracts with the union as of May 1. Of these, Mr. Murray said, approximately 75 per cent (about 490) provided for either a union shop, preferential shop, or contained a sole recognition clause.

Mr. Murray, in his report to the convention, referring to the National Labor Relations Act, said: "The existence among Federal statutes of

this law has been of great assistance in creating, building up and consolidating the position of the SWOC." Because of the act, Mr. Murray said, 5647 members have been reinstated after discharge for union activities, 45 steel companies have paid a total of \$86,200 in back wages, and 37 company unions have been disestablished. A total of 79 agreements of various kinds have been negotiated after refusal-to-bargain charges were filed by the SWOC. These figures, Mr. Murray pointed out, do not include the Republic Steel Corp. case in which some 5000 men were reinstated and a large sum was involved in back pay.

Mr. Murray announced that more

than 700 resolutions had been sent in for action before the convention, including such matters as the 30-hr. week, wage increases, rules and regulations governing steel lodges, the Wagner Act, neutrality, technology in steel, and the question of dissolving the SWOC as a committee and establishing a constitutional union in its place.

This latter point refers to the agreement the SWOC now has with the Amalgamated Association of Iron, Steel and Tin Workers whereby the SWOC is given the right to organize the steel industry and govern lodges established by it.

Other speakers at the convention included Van A. Bittner, SWOC director for the Western region, Thomas Kennedy, secretary-treasurer of the United Mine Workers and former lieutenant-governor of Pennsylvania, and John L. Lewis, president of the CIO.

... THE NEWS IN BRIEF ...

Frameless automobile is analyzed critically and unfavorably by A. O. Smith Corp. engineer.—Page 58.

Automobile production over remainder of 1940 model season will be gaged by sales.—Page 60.

Tell Berna, general manager, National Machine Tool Builders Association, says industry has backlog of \$300,000,000.—Page 61.

Nazi invasion of low countries causes concern in Washington; defense appropriations may be increased.—Page 62.

Walsh-Healey wage clause may be extended to other industries.—Page 66.

Col. J. Munroe Johnson is appointed to ICC.—Page 68.

March steel inventories 11.8 per cent above like month last year, Commerce Bureau reports.—Page 69.

Republic Steel Corp. asks court review of wage case.—Page 70.

CIO loses elections in plants of R. K. Le Blond Machine Tool Co. and Cincinnati Electrical Tool Co.—Page 70.

Minimum wage of 36c. an hour is recommended by Railroad Carrier Industry Committee.—Page 71.

Brazil sets up National Steel Plan Executive Commission in Rio de Janeiro.—Page 71.

Col. Fleming, wage administrator, warns of incomplete labor law records.—Page 71.

National Metal Trades Association will hold annual convention May 21-22 in New York.—Page 73.

R. J. S. Pigott is elected president of American Society for Measurement and Control.—Page 73.

Five new directors are elected by American Iron and Steel Institute.—Page 73.

Michigan meeting of National Conference of Social Work will study social effects of machine.—Page 73.

American Steel Warehouse Association to hold 31st annual convention May 21-22 at New York.—Page 74.

Mid-year meeting of Institute of Scrap Iron and Steel will be held July 22-23.—Page 74.

Guests at spring meeting of American Society of Mechanical Engineers visit Norton Co. plant.—Page 74.

Bureau of Reclamation awards \$184-500 contract to Chicago Bridge & Iron Co.—Page 75.

National Association of Purchasing Agents, holding 25th annual convention June 3, to hear steel executives.—Page 75.

Baltimore Steel Club elects H. Rodgers Dorney, of Jones & Laughlin Steel Corp., as president.—Page 75.

Triple Mill Supply Convention groups elect officials.—Page 75.

Detroit Stamping Co. to build new plant at Highland Park, Mich.—Page 76.

Tinnerman Products, Inc., plans new plant addition in Cleveland.—Page 76.

Rehearing of Steckel case may be sought by U. S. Steel Corp.—Page 76.

Reconstruction program for American enterprise to be discussed by Conference Board May 22 at 24th annual meeting in New York.—Page 76.

Youngstown Sheet & Tube Co. to honor 1080 employees with more than 25 years' service.—Page 77.

Twelfth annual award for beautiful steel bridges is announced by American Institute of Steel Construction.—Page 77.

Jones & Laughlin Steel Corp. must use firemen as helpers on three diesel engines.—Page 77.

Air-conditioned moving picture theater is added to U. S. Steel Corp. exhibit at Worlds' Fair.—Page 77.

Reorganization plan for Follansbee Brothers Co. is approved by Pittsburgh court; company to buy new equipment.—Page 78.

Porcelain enamel industry lacks aggressive sales ideas, P. B. McBride, head of Porcelain Enamel Institute, says.—Page 78.

Bopp Steel Co. to expand its facilities for cold rolling of strip steel.—Page 78.

Domestic consumption of iron and steel scrap declines in April to 2,753,000 gross tons.—Page 79.

Welding cost calculator issued by Champion Rivet Co.—Page 79.

Highland Iron & Steel Co. is organized at Terre Haute, Ind.—Page 79.

Salary production employees at Westinghouse Electric & Mfg. Co.'s East Pittsburgh plant favor employees association.—Page 79.

U. S. Steel Corp. shipments of finished products in April 907,904 net tons, compared with 931,905 tons in March.—Page 79C.

Shell steel specifications found more rigid than in last war; price a stumbling block.—Page 83.

Minneapolis-Moline Power Implement Co. rebuilds after fire destroys two of 13 buildings.—Page 83.

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MEETINGS

- May 20 to 22—American Gear Manufacturers Association, annual meeting, Asheville, N. C.
- May 21 and 22—American Steel Warehouse Association, annual convention, New York.
- May 22 and 23—National Metal Trades Association, Hotel Biltmore, New York.
- May 23—American Iron and Steel Institute, annual meeting, New York.
- June 3 to 6—Annual international convention and Inform-a-Show, National Association of Purchasing Agents, Cincinnati.
- June 6 and 7—Grinding Wheel Manufacturers Association and Abrasive Grain Association, Niagara Falls, N. Y.
- June 17 to 20—American Society of Mechanical Engineers, semi-annual meeting, Milwaukee.

THOUSANDS

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The Reliability of Aircraft Engines

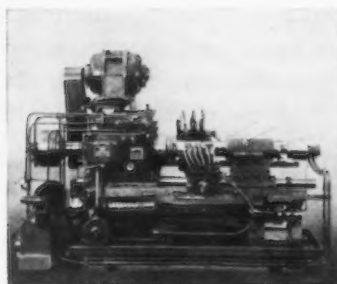
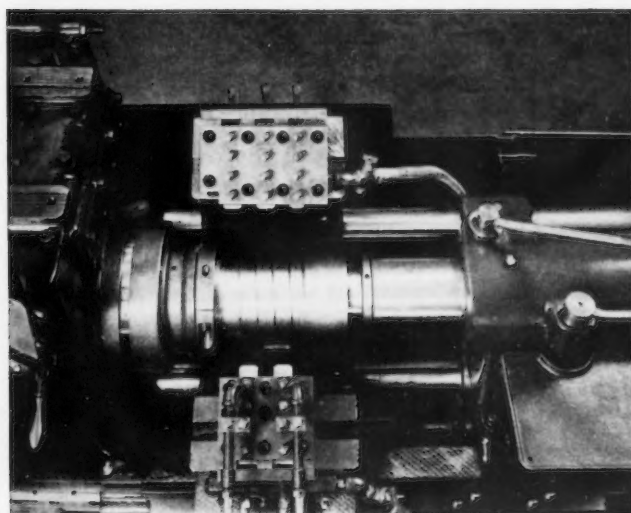
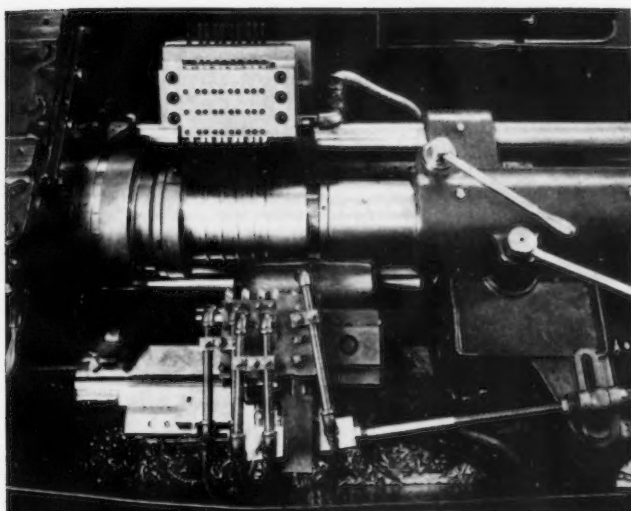


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Left: Upper illustration shows the carriage tools for rough turning the diameters between the ribs on this liquid cooled Airplane Engine Cylinder and the back arm tools for rough facing and forming the ribs and their radii. All these surfaces are finish formed on another Fay Automatic Lathe as shown in the illustration at lower left.



Above: General View of 20"
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Spread of War in Europe Speeds up Canadian Activity

TORONTO — Extending of battlefronts in Europe during the past few days, with consequent increased use of war machines and munitions, has been reflected in a speeding up of war order placements in Canada. Word is received from Ottawa that orders for shells, guns

and other war supplies totaling approximately \$20,000,000 have just been closed or are about to be consummated for the British Government. War orders placed by the Department of Munitions and Supply, Ottawa, for the week were valued at \$2,716,664 made up of 802 contracts.

The placing of enlarged war contracts is directly responsible for increased activities of practically all plants in Canada associated with the iron and steel industry and also have resulted in large plant additions as well as construction of new plants in this country.

After completing a short period of test work, Robert Mitchell Co., Ltd., Montreal, now is going into full production on its initial munition order for the British Government. Further large contracts are pending under the company's arrangement with the British War Supply Board. The company now is proceeding with \$300,000 plant addition at its Belair Avenue works, which when completed and equipped will permit of munitions production on a much larger scale. Financing of the cost of the plant addition has been arranged through the British War Supply Board. Company officials also state that prospects are brighter for a considerable amount of business in fittings and equipment for railroad cars.

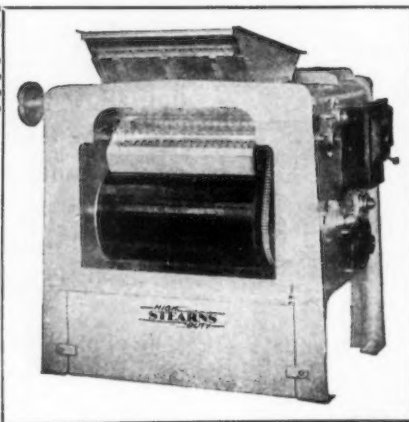
Dominion Plant's Capacity Greater

Officials of Dominion Steel & Coal Corp., Sydney, N. S., state that a second open-hearth furnace has been completed and is in operation, and, with the first new blast furnaces which started production earlier in the year, the entire plant at Sydney now is operating at capacity, with output 30 per cent above the previous rate. Officials further state the British Government is taking any surplus of iron and steel over and above that necessary for domestic use. The company's steel production this year will be the largest in its history.

Ross H. McMaster, president of the Steel Co. of Canada, Ltd., Hamilton, states that over the first quarter of this year demand for the company's products was well sustained, although not equal to the extreme high rate of the last quarter of 1939. Incoming orders, both domestic and for export, supplemented by unfilled bookings, have maintained operations at a high rate of capacity. Shipments have exceeded by a wide margin those of the same months of last year. He stated that work on the plant for dipping tin plate is well advanced and it is expected that operation will start in July. Contracts have been placed for the buildings and machinery in connection with the new 110-in. plate mill, which it is hoped will be completed early next year.

In the Canadian iron and steel markets generally new business is well

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sustained, although somewhat below the high peak reached last September, immediately following the outbreak of the European war. Ordinary domestic demand is running well above the average of the preceding two or three years and to this is added large orders for steel necessary to the production of munitions, guns and other war materials. In addition officials of Canadian steel companies state that export demand for steel and steel products is increasing in volume.

Sheet Mills Booked Solid

Demand for sheets, while somewhat below the high average reached earlier in the year, is quite satisfactory. Canadian mills are booked almost solid to the end of July. Consumers in immediate need of sheets are buying either from the warehouse operators in small tonnage lots or are placing orders with United States mills. It is reported that the automotive industry is placing good orders for sheets, and other large tonnages are pending in connection with production of motor vehicles on war account. Plates have fallen in demand with most new business now coming direct from boiler and tank builders and for ordinary business. Most of the war construction requirements, including shipbuilding, already have been covered, the greater part of this business going to the United States producers.

Minneapolis-Moline Rebuilds After Fire

MINNEAPOLIS—A fire last week destroyed two of the 13 buildings at the suburban Hopkins works of the Minneapolis-Moline Power Implement Co., the loss being estimated at \$250,000. These buildings were devoted to manufacture of combines but the company's production will not be seriously affected, it is said, inasmuch as over 90 per cent of its combine production has already been completed. Concrete is now being poured for foundations for new buildings and vacant structures are being utilized for assembly purposes so that a complete resumption of operations is expected within three weeks. The Ordnance Department's educational order for machining 155 mm. shells, which was awarded to this company (reported this week on THE IRON AGE machine tool activity page) will be unaffected by this fire, since it was assigned to the plant in Minneapolis proper.

Shell Steel Specifications Are More Rigid Than in Last War

NEW YORK—With substantial shell steel business in the offing, as a result of extension of hostilities in Europe, chief stumbling block to a quick placement of such business by the French Government is the question of price.

The French buying commission has

contacted many American steel companies and has submitted shell steel specifications which are so rigid that steel producers will be put to considerable expense in meeting the requirements.

Revision of French design of shells and bombs since the last World War

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CHIPS COST YOU REAL MONEY. Add to the cost of metal alone the cost of manufacturing chips cut from forgings (machining, grinding, finishing time) by your own production department. This cost, plus the price of forgings at the point of delivery, is the true cost of your forgings. Chips cost less when cut off from a T & W forging. Why? Usually there is less metal to machine off. Dies wear out. Pulling a die at the point where it would mean excess metal to cut off, reduces the cost of worthless

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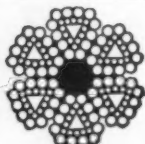
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Are there too many . . . or too few coils?
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Are we paying for operations that can be eliminated?
Should ends be ground . . . or would plain ends answer the purpose?
Why do we have to replace springs?
Are we paying for unnecessarily close tolerances?

ASK

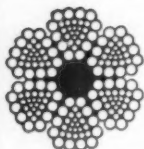
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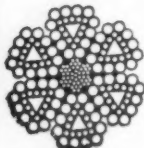
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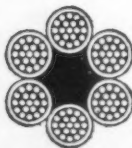
Style B
Flattened Strand



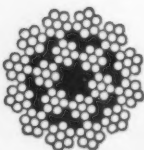
"G"
Flattened Strand



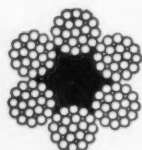
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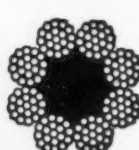
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has made it necessary that shell steel used be of the highest quality, especially in view of the fact that both the shells and bombs have a very thin casing and are heavily charged with explosives. Even a small amount of segregation or other imperfections in the steel used might result in premature explosions.

Furthermore, the French demand a steel that will result in the maximum efficiency in fragmentation. While the French have not placed stringent chemical limits on their shell steel requirements, they have made the physical requirements so strict that steel mills would have to adopt a technique far superior to any used in the last war.

For instance, carbon limits would have to be in a range of five points while manganese range could be no more than 20 points. In order to insure the best quality of steel, discards on the ingot would be unusually high unless hot tops were used extensively.

It is estimated by reliable sources that yields on the ingot to the finished bar might run no more than from 50 to 65 per cent depending on the manufacturer and whether or not hot tops were used. Extra personnel would have to be hired, scrap losses would be high and there would be the continual question of "off" heats. The latter could be diverted, of course, to other orders but if shell steel requirements should reach the totals some expect them to, the number of "off" heats might be greater than could be economically diverted.

Cost Will Be Greater

While it is expected that American steel companies can make the shell steel to the French specifications, it is certain that the cost will be much greater than that involved in making ordinary tube rounds. It is known that tube rounds have been bought by the French previously and made into shells but material was purchased as tube rounds and not on the basis of the rigid shell steel specifications.

There seems to be ample evidence, however, that steel companies in this country and the French representatives will reach some agreement which will soon result in a flow of orders to the United States. First batch of actual orders, however, will probably be in the nature of trial lots and the subsequent volume, assuming proper adherence to the specifications and a successful settlement of the price to be paid, will depend upon the course of the war. Various astronomical figures have been bandied around concerning the amount of shell steel that might

be placed by the French but there is no authentic estimate at this time. The trial orders or order will probably not total much more than 40,000 tons at the most, and even this is considered high.

Meanwhile it is interesting to note that the British have adopted a different buying policy than the French. The English appear to be definitely calling on this country for shells rather than shell steel, one order having already been placed and another is in the negotiating stage. Although the British are placing as much as they can with Canadian interests, it appears that Canada may be unable to take all that will be required with the result that more and more shell business for Great Britain may be placed in this country.

American steel makers are emphatic that they are interested in the French inquiries but the expense to which they would be put in order to meet the exacting specifications will have to be adequately covered in a reasonable price for the material.

Steel Importers in Ireland Look to U. S.

WASHINGTON—A report from Dublin to the Commerce Department asserts that as a result of the European war American firms stand a good chance of supplying the bulk of Ireland's requirements for iron and steel products, tractors, farm machinery as well as a variety of other commodities.

Importers in Ireland are looking to the United States market for supplies formerly obtained in Great Britain and other European countries the report said. It was added that Canada may also share in a greater volume of Irish trade but that shipping space on Canadian vessels leaving for Europe is at a premium.

Allies Order \$150,000,000 More Fighting Planes in U. S.

ORDERS for an additional \$150,000,000 of fighting planes and engines have been placed by the Allied Purchasing Board with American manufacturers since April 25, according to Rene Plevin, French member of the board. Mr. Plevin said that the new orders had gone to the Lockheed, Consolidated and Martin companies, that a \$25,000,000 order is about to be placed with Boeing.

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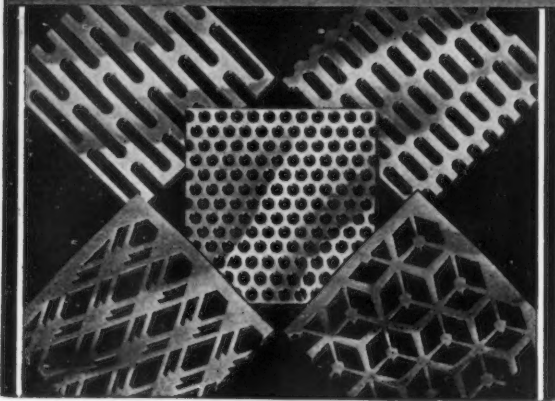
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Columbia Steel's New Sheet Units Operating

SAN FRANCISCO—Several units of Columbia Steel Co.'s Pittsburg, Cal., sheet mill have started operations. The new units set up by the U. S. Steel Corp. subsidiary are a 3-high breakdown mill, a pair furnace, three cold roll mills and the annealing department. Other units scheduled to start this week include two new finishing stands and two new pack furnaces. Columbia's new sheet mill will not add to the present capacity of the plant but will insure improved products for Pacific Coast consumption, company officials say.

E. W. Bliss Building New Plant in England

THE E. W. Bliss Co., of Brooklyn, is expanding its British manufacturing subsidiary. About \$750,000 is to be spent for a new building and equipment at Darby, England. Much the same class of equipment will be made as in this country, namely mechanical and hydraulic presses and other types of heavy industrial machinery.

Standard of New Jersey Places Pipe Still Contract

STANDARD OIL CO. OF NEW JERSEY placed a contract last Friday with Arthur G. McKee & Co., Cleveland, for construction of two pipe stills at the Bayway refinery, Elizabeth, N. J. Their capacity will be 30,000 bbl. a day. The new stills will replace 24 continuous shell stills and will be used for refining of crude oil from the eastern and western Texas fields. Construction will be started at once and is to be completed within 10 months. No estimate of costs was announced.

Armco to Rebuild Hamilton Furnace

MIDDLETOWN, Ohio — American Rolling Mill Co. will tear down and rebuild with enlarged capacity one of its two blast furnaces at Hamilton, Ohio. The stack is the one moved from Columbus to Hamilton several years ago. Arthur G. McKee & Co., Cleveland, has been awarded the contract. Work will be started soon. When completed the monthly pig iron capacity of the furnace will be around 20,000 tons compared with 12,000 tons per month at present.

President Asks \$12,500,000 For Strategic Materials

WASHINGTON—Preceding a special message requesting large additional funds for national defense, inspired by fast moving developments in the European war situation, President Roosevelt on Monday asked Congress for \$12,500,000 additional for the purchase by the Treasury Department of strategic materials and \$2,900,000 for the War Department for Porto Rican seacoast defenses. These sums were a part of a total of \$63,000,000 supplemental and deficiency appropriations which were asked.

The proposed \$12,500,000 for strategic materials would supplement a like sum recently voted, \$3,000,000 of which was made available for purchases before the end of the current fiscal year. One year ago Congress appropriated \$10,000,000 for the purchase of strategic materials. The original act authorized \$100,000,000 for such purchases.


The White House announcement that the President would send a message to Congress some time this week for additional national funds to supplement the \$2,000,000,000 already appropriated for the Army and Navy was made by Stephen Early, secretary to the President. He cautioned the press against "going out on a limb" regarding the total to be asked, stating that at that time the President had not determined upon any definite amount. There had been previously published estimates of \$500,000,000.

Newport News Shipbuilding Sold to Tri-Continental Corp.

OWNERSHIP of Newport News Shipbuilding & Dry Dock Co., Newport News, Va., has been transferred to Tri-Continental Corp. and a group of associated investment companies and banking firms. Certificates for the company's outstanding common stock of 100,000 shares have been turned over by the Huntington family and institutions which had an interest in the company to officials of an investment banking subsidiary of Tri-Continental Corp. Two-thirds of the shipbuilding company's stock is expected to be offered to the public.

Electric Furnace Purchased

PITTSBURGH—Indianapolis-Electric Steel Casting Co. here has purchased from American Bridge Co., a 3-ton Heroult gantry removable top electric furnace with a 3000 kva. transformer.




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- Public Institutions
- Playgrounds, Parking Lots
- Schools, Parks, Estates

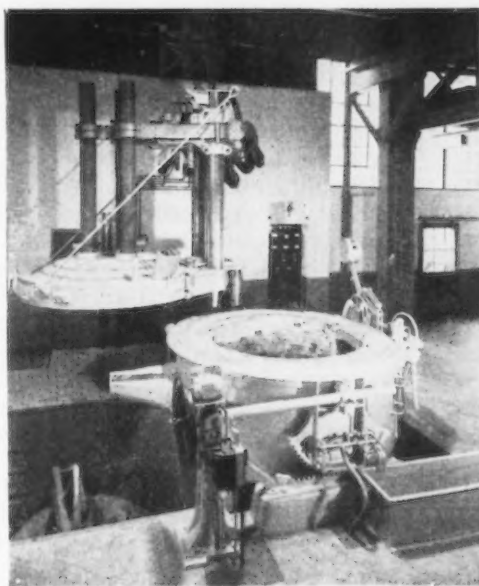
Sales Representatives in
51 Principal Cities

CONTINENTAL STEEL CORP.
KOKOMO, INDIANA

Certified  *Quality*

CONTINENTAL

Chain Link Fence



**USE
MOORE RAPID
Lectromelt
FURNACES**

**for
MELTING
REFINING
SMELTING**

Illustration shows top charge type LECTROMELT furnace with roof raised and rotated to one side to permit quick charging with drop bottom bucket.

LECTROMELT furnaces offer the rapid and economic means for the production of plain carbon and alloy steel ingots and castings as well as gray and malleable irons. Top charge and door charge types are both available. LECTROMELT furnaces are built in standard capacities from 25 pounds to 100 tons. Write for details.

PITTSBURGH LECTROMELT FURNACE CORP.
Foot 32nd St. Pittsburgh, Pa.

Foundrymen Scrutinize New Casting Practices

(CONTINUED FROM PAGE 51)

door to push the latches open in case of an explosion, thus preventing damage to the door. The door columns are also fitted with a series of circular openings which draw in smoke which usually would seep into the outside atmosphere, thus making possible a much cleaner baking room. A combination oil and gas burner is also available now, as is a new time and temperature control system which eliminates guesswork in core baking. Heat for the baking is provided by a two-zone method of distribution, a feature said to give better heat distribution.

At the Milwaukee Foundry Equipment Co. booth, a new high production jolt squeeze rollover pattern draw molding machine with a 12-in. draw was on exhibit. This machine can accommodate flasks up to 42 x 32 in. and has automatic clamps. Osborn Mfg. Co. displayed a new vibrating squeeze jolt machine with a 10-in. cylinder especially recommended for turning out complicated molds. A jolt squeeze stripper capable of accommodating a wide variety of work was also shown. This machine has an oil draw which starts very slowly and then speeds up after contact between the pattern and sand is broken. Speed and length of both movements are adjustable. Modern Equipment Co. exhibited an ingenious electric mold skin drier for drying molds with deep pockets. This drier was equipped with blower for distributing the heat uniformly.

Keeping the screens in shakeout, tempering and screening machines clean is always a problem. The new Sta-Kleen screen exhibited by Allis-Chalmers Mfg. Co. solves this prob-

lem by dividing the secondary or retaining deck, which is located several inches below the screen cloth, into numerous compartments in which are located specially made rubber balls. In operation these balls bounce rapidly against the screen cloth, preventing blinding. Robbins Conveying Belt Co. had in operation a new low priced shakeout screen capable of handling 500 lb. flasks. This machine was designed primarily for the smaller foundry and is built along the lines of the company's larger shakeout screens.

Beardsley & Piper Co. displayed the new Speedslinger which is capable of ramming two tons of sand per minute. This versatile machine is adapted especially to ramming up large work. The operator is seated at the rammer head and can control every movement of the machine. Also on display at the Beardsley & Piper booth were Speedmullors equipped with rubber tired mullors and rubber lined bowls. This bowl lining which is optional, is said to greatly increase the life of the bowl and lower maintenance costs.

N. Ransohoff, Inc., had in operation a wet tumbling mill which is a combination of a side loading wet tumbling barrel, an automatic end unloading star separation and return barrel, and an automatic sand settler and remover. Castings are continually flushed with cleaning compound while being tumbled, which eliminates dust and speeds the cleaning cycle.

American Optical Co. introduced at the exhibition a new, low priced, lightweight respirator which is startling in the simplicity of its design. It is built of ribbed filter cloth over a wire

frame and is approved by the Bureau of Mines. It can be cleaned thoroughly by brushing or blowing off with air. A Ful-Vue goggle with split, blue and white safety lens, was also shown by the company for the first time. These goggles, designed for open hearth and furnace work, combine in one unit the advantages of both white and blue safety lens. By tilting the head, metal can be observed through the upper blue portion of the lens, while in a normal position, the clear portion covers the field of vision. An impact briquetting machine for cast iron borings with an output of two tons per hr. was described at the Doelger & Kirsten, Inc., booth. This machine is powered with a 20 hp. motor and is said to produce briquets with an exceptionally high density. International Molding Machine Co. displayed an automatic rotary core blower which attracted considerable attention. This machine blows four cores in each operating cycle.

An L-type hydraulic testing machine for small plants, vocational schools, etc., where funds available for testing work are limited, was exhibited by Tinius Olsen Testing Machine Co. This unit occupies 10 sq. ft. of space and has a capacity of from 20,000 to 60,000 lb. Indicating gages are mounted on an instrument panel, isolated from the loading cylinder, while the cylinder itself is located in the base of the unit, to lower its center of gravity. An electronic recorder which gives a permanent record of tests can be obtained for use with this unit. Several improvements were noticeable in the machines displayed by Riehle Testing Machine Division, American Machine & Metals, Inc. These refinements include the use of a clutch on the low speed shaft of the loading system motor and make it possible to stop loading instantly without over-run and which also permits inching to extremely small intervals of load. This drive also includes a variable speed transmission for infinite variations in speed from zero to maximum, controlled by a small handwheel. Also shown was the improved precision pendulum load indicator for testing machines of hydraulic or lever type.

A new spark unit for controlling primary and secondary voltage, secondary induction, secondary power and exposure time for high voltage excitation of spectrographic specimens was shown at the Harry W. Dietert Co. booth. The high power output of this unit is said to assure an intense spark which makes it

TABLE I
Analyses of Refractory Materials Tested by Bowers and MacKenzie*

	Stone A	Stone B	Fire Brick
Alumina, per cent	0.51	2.78	29.08
Iron Oxide, per cent	0.29	0.86	2.90
Titanium Oxide, per cent	0.40	0.20	1.80
Calcium Oxide, per cent	0.80	0.10	1.14
Magnesium Oxide, per cent	0.07	0.05	
Alkalies, per cent	0.16	0.28	2.40
Loss on ignition, per cent	1.00	0.90	...
Sulphuric Anhydride, per cent	0.19
Silica, per cent	95.58	94.87	62.68
Fusion Point, deg. F.	Above 3200	...	3002

* Analyses supplied by manufacturers.

equally applicable for both high and low concentrations of test elements and for both qualitative and quantitative analyses. Another new piece of equipment displayed by this company was a developing machine for developing spectrographic films. This unit consists of four solution trays, the developer, the shortstop, the hardening, and the fixing solution, which are rocked continuously by a small motor. Developing and fixing of a film can be accomplished in 2½ min. with this machine, it is claimed.

A new conical shell type furnace was shown by the Detroit Electric Furnace Division, Kuhlman Electric Co. This design gives a greater depth of metal under and near the arc, making for a more efficient heat transfer, lowers refractory maintenance costs, and eliminates cool end zones. A new sliding contact cable connector now available with these furnaces is said to greatly reduce cable replacement costs. An automatic rocking controller shown also aroused considerable interest. This controller enables the operator to set the initial rock at any desired angle, to continue rocking through that angle for any desired number of minutes and then to progressively increase the angle of rock from its initial setting to full rock in any desired interval.

The Whiting Corp. displayed an improved bottom tapping rig for small ladles which is said to greatly lower the time required to reline the ladle. The tapping rig on the larger ladles has also been improved. The goose-neck of these ladles can be quickly removed for repairs. A combination skip hoist—horseshoe ring type mechanical charger with a bottom drop bucket was also shown.

A small, unit dust exhaustor and filter rated at 450 cu. ft. per min. was shown for the first time at the exhibit of Continental Roll & Steel Foundry Co. This unit, designed for isolated exhausting jobs, as from a single grinding wheel, etc., is powered with a one hp. motor and requires no bins or lead off pipes. Air, after cleaning, is returned to the room. A semi-automatic polishing and buffing machine designed to handle a wide range of hard-to-handle work was also on exhibition by this company. This machine features a double action work holder which moves in two directions, bringing the work opposite or surrounding the wheel. Pressure on a convenient pedal causes the work to be floated into the wheel. Work head has an automatic oscillat-

TABLE II
Effect of Sulphur on Machinability of Electric Furnace Irons

Average time in hundredths of a min. to drill ¾-in. hole ¼-in. deep at 474 r.p.m. under 160-lb. load.

Sulphur per cent	Section Size				
	2-in.	1-in.	½-in.	¼ in.	⅛-in.*
0.027	11	13	13	12	s.
0.097	14	13	14	14	m.
0.110	14	14	14	16	u.
0.14	12	12	14	14	m.
0.172	11	11	11	12	m.
0.207	12	14	16	14	m.
0.281	13	13	14	14	m.
0.295	15	16	16	16	m.
0.36	18	20	23	23	m.
0.500	25	26	25	28	s.

*m. denotes machinable for ⅛ in. section.

u. denotes unmachinable for ⅛ in. section.

s. denotes slightly machinable for ⅛ in. section.

ing stroke adjustable from zero to one inch.

An air filter incorporating electrical precipitation as an integral function was shown by American Air Filter Co., Inc. In operation, air enters the filter through a curtain which is not electrically charged. Here lint, heavier dust particles and other large foreign matter are removed. Fine dust particles and smoke which pass this first curtain, are carried through an ionizer where they receive an electrical charge before passing on to a rear curtain. These particles are then drawn into the electrostatic field of the rear curtain and caught there in an oil film. The combination of these two methods is said to result in an unusually high cleaning efficiency over a wide range of particle sizes.

Wet disposal units for dry type dust collectors was an innovation exhibited by American Foundry Equipment Co. This unit, entirely self contained, receives dry dust from the collector, thoroughly mixes it with water, and deposits the mixture into a sludge discharge at the bottom of the unit. A long cone type dust collector featuring high efficiencies with relatively low back pressures were also shown. The company also displayed new smaller sizes of assembled type Dustube collectors. Perhaps the most spectacular part of this company's exhibit was a huge, high production, continuous Tumblast unit in actual operation. Material to be cleaned enters this unit from one end on a belt and exits, cleaned, from the other end. On an average job, approximately six tons per hour can be handled.

A new graphitizing alloy composed essentially of silicon, manganese and zirconium, for ladle addition to cast

iron, was announced at the show by Union Carbide & Carbon Corp. This alloy, known as SMZ, is said to be particularly effective in converting a normally hard white iron into a high strength gray iron. It also reduces chill, minimizes wall sensitivity and improves the microstructure of iron with resultant betterment in physical properties.

National Engineering Co. showed a new 75-ton Simpson mixer, equipped with controls which automatically proportions bond and moisture additions, regulates size of batch, loading, mulling and discharging on a fixed time cycle. Carborundum Co. exhibited two newly developed types of resinoid bonded wheels for foundry grinding. These two wheels are the K series, Aloxite brand aluminum oxide and the C series, Carborundum brand silicon carbide wheels.

3000 Visit Ryerson Plant at Chicago

CHICAGO—Following a path blazed by painted golden arrows, more than 3000 friends and customers of Joseph T. Ryerson & Son, Inc., visited the 21½-acre Ryerson plant here last Saturday at an open house party. From executive offices down to laboratories, fabricating departments and the many warehouses, where more than 11,000 kinds, shapes and sizes and from 50,000 to 75,000 tons of steel are carried in stock, all was spick and span for the occasion. Following the 2-hr. tour through what is said to be the largest steel service plant in the world, a buffet luncheon awaited the visitors.

Westinghouse Stages Machine Tool Forum

(CONTINUED FROM PAGE 54)

Landis Tool Co. Chief attention was given to the design of the drive of the mechanism for oscillating the work so as to generate the ball groove curvature. It is necessary to stop the oscillating head in one position in order to prevent marring of the work after the wheel and work revolving spindles have stopped. A cam operated plunger switch is used to stop the oscillating column in position and to eliminate inaccuracies due to the width of the cam; this stopping is sequenced by means of a three contact switch and a relay. At first a standard magnetic disk brake was used for stopping the motor, but this proved unsatisfactory because the braking effort diminished as the motor warmed up during a day's run. Then dynamic braking was combined with magnetic braking, but this system was subject to the same drawback.

In the final design, an open-delta motor is used for the oscillation motion drive and the motor is first reduced to one-third speed by shorting one phase of the winding before straight dynamic braking is applied. With this system, variation in stopping position is now about 1 deg. of arc. While braking is less effective when the motor is hot, this condition is compensated for by the lower speed obtained from the motor under this condition. Best results are obtained when the open-delta connected motor has a high resistance rotor. Direct current for dynamic braking is obtained from a stack type rectifier.

Mr. Elberty called for a show of hands from the audience to see how many machine builders were taking advantage of special motors for special applications. Only one other company was. The chief deterring influence appears to be the preference of the automotive industry for standard type motors which can readily be serviced without undue delay.

New N.E.M.A. Standards

The new N.E.M.A. frame sizes which are to become effective Oct. 1, 1940, were analyzed by R. W. Owens, of Westinghouse. Frame sizes 204, 224 and 225 are affected and a new frame size, the 203, has been added. These cover the smaller motors up to 5 hp., 3600 r.p.m. Certain dimensions are smaller and in general it may be said that the old dimensions have

been dropped one frame size, that is, the former standard outside dimensions of the 224 size apply to the new 204 size and the old 204 size dimensions apply to the new 203 frame. These frame sizes cover single and polyphase a.c. motors and d.c. motors. The new dimensions meet a demand from industry for motors of smaller sizes, more in line with average motor sizes prevailing before the original N.E.M.A. standards were first worked out.

Standard Controllers Proposed

In a later session, D. K. Frost, electrical engineer, Mattison Machine Works, pleaded for standardization of motor control sizes. Standard ratings of contactors have been recognized, but the sizes and proportions vary widely. Some are wide and low, others narrow and high. If it took 15 years to get motors standardized, Mr. Frost thinks now is the time to start thinking about controllers. He believes the controls should be self-contained in the machine and should be so arranged that cross connections or inter-locking connections can be readily be made. Mattison makes up a large number of its machine controls from stock items, such stock consisting of individual switches together with coils of various frequencies and voltages, overload heater units, relays, terminal blocks, switchboard wire and cleats, also extra interlocks, both normally closed and normally open. With such interchangeable units, it is readily possible to work out various combinations of sequencing controls.

A great deal of discussion of the group hinged around the problem of identifying wires in these complicated control panels and their connections. Most engineers prefer some kind of a color system in addition to a system of terminal numbering. In this connection, Mr. Frost predicted that some day the machine tool industry would have a wiring code of its own instead of being forced to follow present house wiring standards.

Installation Problems

With electrical systems becoming more complicated each year, it is necessary that more and more information be given plant operating men about the electrical equipment being shipped into their plants. A. H. Platt, electrical engineer, Bullard Co., called attention to the information that should be available to him well in advance of the receipt of the machine in the plant, such as the number of motors involved, their horsepower and

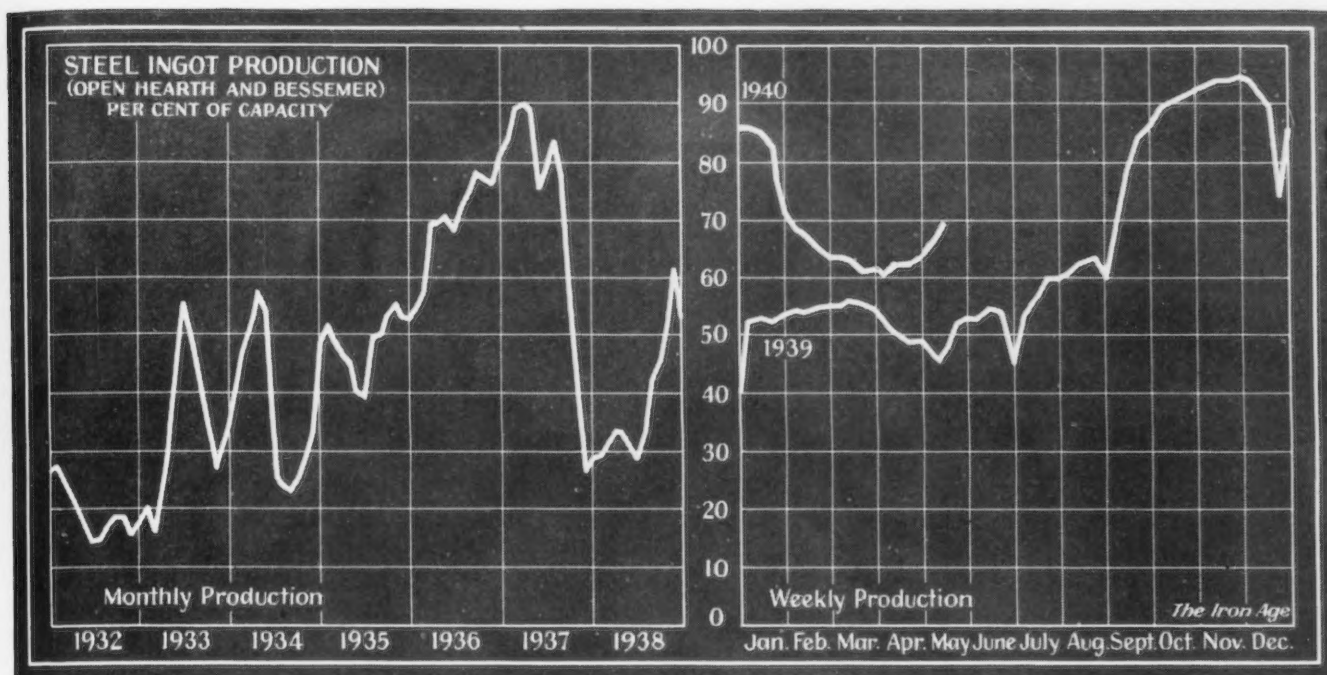
the size and location of conduits connecting various parts of the machine. A complete wiring diagram should be included for all machines involving special wiring, interlocks or relays so that it may be thoroughly studied and understood before the installation work is started. Should it be necessary to disconnect any electrical equipment before shipment of the machine from the maker, all wires and terminals should be plainly marked with metal tags.

Considering that many machine tools today are being worked to capacity under adverse conditions of oil vapor, coolant, cast iron dust and chips, Mr. Platt advocated the wider use of totally inclosed, fan cooled motors in place of the open types. He believes that the lessened maintenance more than offsets the additional first cost. He was challenged on this point by a representative of the automotive industry who indicated that maintenance costs of inclosed motors were high and that in his company open type motors were to be preferred.

Synchro-Tie Transmissions

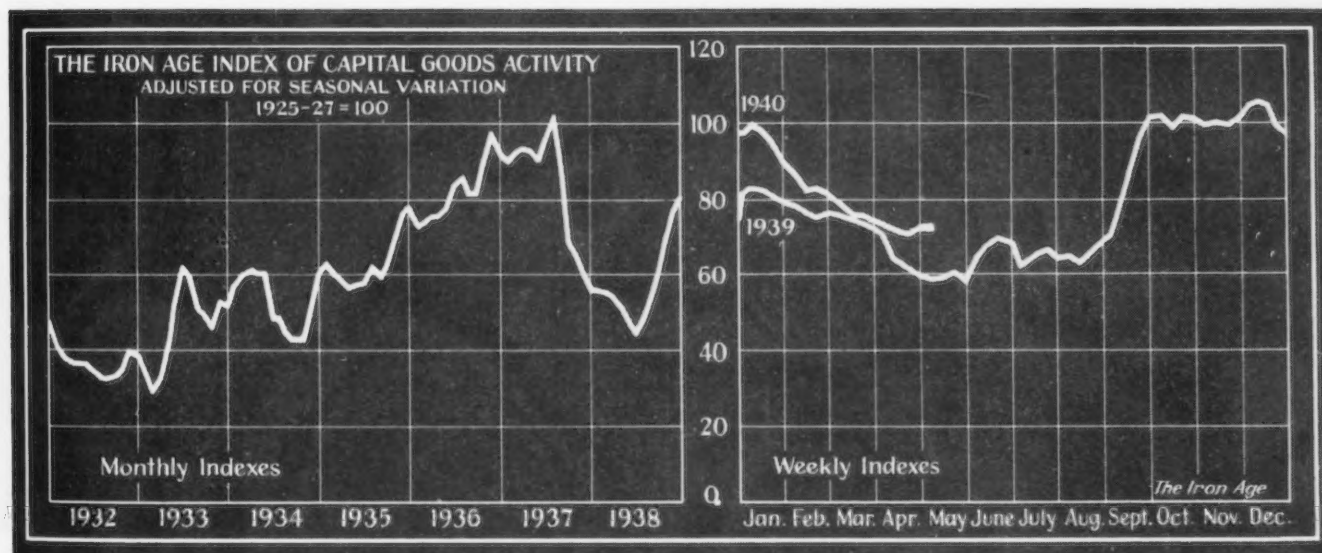
Coordination of movements of widely separated elements on large machine tools can be effectively obtained by the Synchro-Tie electrical drive system, which was explained by C. W. Drake of Westinghouse. New to machine tool drives, but well known as electrical position indicators, a Synchro-Tie is a combination of two or more wound rotor induction motors electrically connected so that a movement of one produces a similar movement of the other. One of the motors must be driven by a separate prime mover and is known as the transmitter. The receiver motor will make the same number of revolutions in a given time as the transmitter, though there must be a slight phase displacement, corresponding to the torsional twist of a lineshaft. Rotation may be in either direction. Speed is a function of the number of poles and is limited to two-thirds synchronous speed if rotation acts to aid field, but is limited only by the machine losses if rotation acts to buck the magnetic field rotation. Mr. Drake indicated that a 40-ft. boring mill was now being built for Westinghouse in which the traverse mechanisms on the rail will be driven through a pair of Synchro-Ties which get their power from the main driving motors in the pit, both of which are geared up to the table ring gear. Feed of the two cross heads is uniform and is in fixed relation to table rotation.

Ingot Rate Rises Three and One-Half Points to 70% of Capacity



District	Ingots	Pitts-	Chicago	Valleys	Phila-	Cleve-	Buffalo	Wheel-	Detroit	Southern	S. Ohio	Western	St. Louis	East-	Aggre-
Production, Per Cent of Capacity		burgh			delphia	land		ing			River			ern	gate
CURRENT WEEK..		66.0	71.5	62.0	75.0	73.0	64.5	94.0	81.5	81.5	72.0	70.0	52.0	50.0	70.0
PREVIOUS WEEK..		62.0	65.5	61.0	75.0	66.0	63.0	93.0	73.5	81.5	72.0	70.0	39.5	57.0	66.5

Capital Goods Index Maintains Previous Gain



WHILE there is not yet sufficient information accumulated to justify the definite assertion that the heavy goods industries are finally advancing into the long awaited spring improvement, there are numerous factors visible that would suggest that the groundwork of such a movement is being laid. This is borne out by THE IRON AGE index of capital goods activity, which in the past week held the gains recorded in the preceding week. For the weeks ended May 11 and May 4, the index stood at 72.4, as compared with 71 in the week of April 27. In the past week, the steel series shot upward in a counterseasonal movement, while the decline in automobile assemblies was again exactly equal to seasonal experience, leaving the adjusted index of this component unchanged for the third consecutive week. Chief restraining factors

of the index are the construction and lumber carloadings series.

	Week Ended May 11	Week Ended May 4	Comparable Week	
			1939	1929
Steel ingot production ¹	86.2	81.3	59.9	128.5
Automobile production ²	82.3	82.3	60.5	127.4
Construction contracts ³	52.7	54.8	74.1	123.1
Forest products carloadings ⁴	55.1	59.6	53.2	115.4
Production and shipments, Pittsburgh District ⁵	85.5	83.8	47.8	124.3
Combined index	72.4	72.4	59.1	123.7

Sources: ¹ THE IRON AGE; ² Wards Automotive Reports; ³ Engineering News-Record; ⁴ Association of American Railroads; ⁵ University of Pittsburgh. The indexes of forest products carloadings and activity in the Pittsburgh area reflect conditions as of the week ended May 4. Other indexes cover the week of May 11.

... SUMMARY OF THE WEEK ...

... Invasion of Belgium and Holland has quick repercussions here.

o o o

... Heavy export demand expected from Allies and neutral countries.

o o o

... Steel operations rise to 70 per cent, and composite scrap price jumps 83c.

THE extension of the war area to Belgium and Holland has already caused wide repercussions affecting the steel and allied industries of the United States.

Great Britain, probably cut off from supplies of steel from Belgium, upon which she depended to a considerable extent, will look to the United States to make up the deficiency. Inquiries for about 100,000 tons are being quoted on, and others are expected to follow shortly. France is inquiring for shell steel, of which a large quantity may be bought as soon as complications arising from very rigid specifications are straightened out. Britain is expected to hurry the placing of additional shell and other munitions contracts that have been under negotiation here.

Belgium was not only supplying England with about 200,000 tons of steel a month, but was maintaining some export trade in other markets, which probably will be forced to come to the United States for supplies. It is estimated that about 4,500,000 tons of steel a year previously sold by Belgium in world markets may be added to American sales, which would approximately double the volume of recent months.

Domestic consumers of steel, although not rushing into the market in the manner in which they did last fall when the war started, have increased their orders in the past several days for nearly all products. Sheets and strip, for which a growing volume of specifications is being received for rolling and shipment by June 30, have not been the sole beneficiaries of the improved buying. At Pittsburgh bookings so far in May are reported to be 35 to 45 per cent ahead of the volume in the same period of April.

An apparently direct effect of the more intensive warfare in Europe is a rush of inquiries for reinforcing bars, a situation that may impart some firmness to this product, which has been the weakest item in the steel list.

Holland had recently been a good buyer of American steel. Some shipments on the ocean were turned

back, while orders not yet processed have been suspended. Mediterranean countries have also bought here quite liberally, but in view of the possible spread of the war to that area United States mills have recently been selling only on a c.i.f. basis so that any risks are entirely for the account of the buyer.

No alarm is felt by steel companies that a shortage of tin will develop. Nearly all makers of tin plate have supplies sufficient for several months, and unless the Far East becomes a war zone additional shipments will not be stopped.

IN the scrap markets conditions resemble the runaway situation of last fall when THE IRON AGE scrap composite price advanced a total of \$6.88 a ton within a month. This week's rise in the scrap composite price is 83c., bringing it to \$17.58, or within a few cents of the average at the beginning of the year. At Pittsburgh there has been an advance of \$1.50, while Chicago and Philadelphia prices are up 50c. Cleveland and Youngstown prices are \$1 a ton higher and advances at Detroit range from 50c. to \$1. In expectation of a further rise, scrap dealers are reluctant to sell.

Steel operations have gained three and a half points over last week to 70 per cent of capacity and still higher production is expected by many producers within the next few weeks. This is predicated on an anticipated increase in export sales together with an acceleration of domestic buying as a protective measure against possible delays in mill deliveries later on. A considerable volume of sheets and strip is yet to be specified against recent low-priced commitments if buyers exercise their options in full. In view of the turn in the situation, mills are putting on additional pressure to insure completion of these orders by June 30.

In addition to probable additions to foreign steel requirements, mills expect that Congress will authorize an enlarged defense program for the United States and an expediting of work now under way. Moreover, a number of industrial expansion programs that had been dormant have sprung to life. For example, an oil refinery project that had been abandoned early last week was revived on Friday and the contract was immediately let. The railroads also are expected to hurry up their 1940 programs, if steel shortages or high prices seem likely. Moreover, automobile companies will purchase steel in June for their initial production of 1941 models.

Shipbuilding contracts have been added to by the placing of 10 tankers by the Sinclair Refining Co. with two shipbuilders. These boats will take 38,000 tons of steel.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	May 14, 1940	May 7, 1940	Apr. 16, 1940	May 16, 1939
Rails, heavy, at mill	\$40.00	\$40.00	\$40.00	\$40.00
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	40.00
Re-rolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 5 to 9/32 in., Pittsburgh, Chicago, Cleveland, cents per lb.	2.00	2.00	2.00	1.92
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

Finished Steel

Cents Per Lb.:	May 14, 1940	May 7, 1940	Apr. 16, 1940	May 16, 1939
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.15
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes, Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.10
Alloy bars: Pittsburgh, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.70
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.10	2.10	1.90	2.00
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.80	2.80	2.60	2.80
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham	3.50	3.50	3.50	3.30
Hot rolled sheets: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.10	2.10	1.90	2.00
Cold rolled sheets: Pittsburgh, Chicago, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.05	3.05	2.85	3.05

Cents Per Lb.:	May 14, 1940	May 7, 1940	Apr. 16, 1940	May 16, 1939
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.55	2.55	2.55	2.45
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.60
Tin plate, 100 lb. base box: Pittsburgh and Gary	\$5.00	\$5.00	\$5.00	\$5.00

Pig Iron

Per Gross Ton:	May 14, 1940	May 7, 1940	Apr. 16, 1940	May 16, 1939
No. 2 fdy., Philadelphia	\$24.84	\$24.84	\$24.84	\$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, Foundry, Chicago	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	21.34	21.34	21.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. charcoal, Chicago	30.34	30.34	30.34	28.34
Ferromanganese, seab'd carlots	100.00	100.00	100.00	80.00

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:	May 14, 1940	May 7, 1940	Apr. 16, 1940	May 16, 1939
Heavy melting steel, Pgh.	\$18.75	\$17.25	\$16.25	\$14.25
Heavy melting steel, Phila.	17.25	16.75	16.75	15.25
Heavy melting steel, Chgo.	16.75	16.25	15.25	12.75
Carwheels, Chicago	18.25	17.75	16.75	12.50
Carwheels, Philadelphia	20.75	20.25	20.25	16.00
No. 1 cast, Pittsburgh	18.75	17.75	17.75	15.25
No. 1 cast, Philadelphia	20.25	20.25	20.25	16.25
No. 1 cast, Chgo (net ton)	16.25	15.75	14.75	11.75

Coke, Connellsville

Per Net Ton at Oven:	May 14, 1940	May 7, 1940	Apr. 16, 1940	May 16, 1939
Furnace coke, prompt	\$4.00	\$4.00	\$4.00	\$3.75
Foundry coke, prompt	5.25	5.25	5.25	4.75

Non-Ferrous Metals

Cents per Lb. to Large Buyers:	May 14, 1940	May 7, 1940	Apr. 16, 1940	May 16, 1939
Copper, Electrolytic, Conn.*	11.50	11.50	11.50	10.00
Copper, Lake, New York	11.50	11.50	11.50	10.00
Tin (Straits), New York	53.00	47.625	47.25	48.875
Zinc, East St. Louis	5.75	5.75	5.75	4.50
Zinc, New York	6.14	6.14	6.14	4.89
Lead, St. Louis	5.00	5.00	5.10	4.60
Lead, New York	4.85	4.85	4.95	4.75
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	14.00

*Mine producers only.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

Finished Steel

	May 14, 1940	One week ago	One month ago	One year ago
2.261c. a Lb.	2.261	2.211	2.236	
Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.				
HIGH	2.261c., Jan. 2	2.211c., Apr. 16		
LOW	2.236c., Jan. 3	2.236c., May 16		
1940.....	2.512c., May 17	2.211c., Oct. 18		
1939.....	2.512c., Mar. 9	2.249c., Jan. 4		
1938.....	2.249c., Dec. 28	2.016c., Mar. 10		
1937.....	2.062c., Oct. 1	2.056c., Jan. 8		
1936.....	2.118c., Apr. 24	1.945c., Jan. 2		
1935.....	1.953c., Oct. 3	1.792c., May 2		
1934.....	1.915c., Sept. 6	1.870c., Mar. 15		
1933.....	1.981c., Jan. 13	1.883c., Dec. 29		
1932.....	2.192c., Jan. 7	1.962c., Dec. 9		
1931.....	2.236c., May 28	2.192c., Oct. 29		
1930.....				
1929.....				

Pig Iron

	May 14, 1940	One week ago	One month ago	One year ago
\$22.61 a Gross Ton	22.61	22.61	20.61	
Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.				
HIGH	\$22.61, Sept. 19	\$20.61, Sept. 12		
LOW	23.25, June 21	19.61, July 6		
1940.....	23.25, Mar. 9	20.25, Feb. 16		
1939.....	19.73, Nov. 24	18.73, Aug. 11		
1938.....	18.84, Nov. 5	17.83, May 14		
1937.....	17.90, May 1	16.90, Jan. 27		
1936.....	16.90, Dec. 5	13.56, Jan. 3		
1935.....	14.81, Jan. 5	13.56, Dec. 6		
1934.....	15.90, Jan. 6	14.79, Dec. 15		
1933.....	18.21, Jan. 7	15.90, Dec. 16		
1932.....	18.71, May 14	18.21, Dec. 17		

Steel Scrap

	May 14, 1940	One week ago	One month ago	One year ago
\$17.58 a Gross Ton	16.75	16.08	14.08	
Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.				
HIGH	\$17.67, Jan. 2	\$16.04, Apr. 9		
LOW	22.50, Oct. 3	14.08, May 16		
1940.....	15.00, Nov. 22	11.00, June 7		
1939.....	21.92, Mar. 30	12.92, Nov. 10		
1938.....	17.75, Dec. 21	12.67, June 9		
1937.....	13.42, Dec. 10	10.33, Apr. 29		
1936.....	13.00, Mar. 13	9.50, Sept. 25		
1935.....	12.25, Aug. 8	6.75, Jan. 3		
1934.....	8.50, Jan. 12	6.43, July 5		
1933.....	11.33, Jan. 6	8.50, Dec. 29		
1932.....	15.00, Feb. 18	11.25, Dec. 9		
1931.....	17.58, Jan. 29	14.08, Dec. 3		

... THIS WEEK'S MARKET NEWS ...

STEEL OPERATIONS

... Rate for industry rises to 70% and is headed higher

INGOT production for the industry as a whole approximates 70 per cent of capacity this week, a gain of $3\frac{1}{2}$ points over last week. Steel companies look for higher operations between now and the end of June, with indications that demand from abroad will prevent any summer slump.

The PITTSBURGH district is up two points to 66 per cent, CHICAGO operations have gained six points to $71\frac{1}{2}$ per cent, YOUNGSTOWN is up a point to 62 per cent, the CLEVELAND-LORAIN district, which was off slightly last week, has jumped seven points to 73 per cent, DETROIT has gained eight points to $81\frac{1}{2}$ per cent and ST. LOUIS is up more than 12 points to 52 per cent. Other districts have either held at last week's rate or have gained slightly.

Carnegie-Illinois Steel Corp. has blown in two blast furnaces, one in the PITTSBURGH district and one in the CHICAGO district.

NEW BUSINESS

... Bookings running well ahead of a month ago

WITH total bookings at PITTSBURGH so far this month running from 35 to 45 per cent ahead of the same period last month, steel producers look for latest foreign developments to quicken the tempo of export buying, especially by Great Britain and France. With forward sheet buying, export demand at a fairly high level and a mild seasonal upswing already under way, increased and heavy purchases by England and France would tend to simulate the condition of tight steel supplies prevalent last fall. That such a condition might occur is possibly reflected in the British asking for prompt data on additional semi-finished steel supplies which they heretofore obtained from Belgium.

Virtually all CHICAGO sales offices have during the past week experienced increases in new business, some quite substantial. Incoming orders today are geared more closely to actual production than has been the case for some time, one mill for example, which is operating at slightly less than 80 per cent, reporting new business coming

in at the rate of about 75 per cent of capacity. Another mill is receiving about double its March business and about 50 per cent more than a month ago. All sellers agree that this increase should be attributed largely to a miscellaneous and well diversified upturn, and not to sheets primarily, as might at first be believed, considering the tonnage of sheets now on the books in the form of blanket orders at the 1.90c. price.

Among the products which made important contributions to this week's improvement are various types of alloy steel, small structural and bar shapes, wire and wire products, bars, and plates.

As an indication of the activity in farm tractors and implements, the report to the stockholders of the International Harvester Co. is of interest. In the six months ended April 30, the Harvester company increased domestic business by 30 per cent and decreased foreign trade by 10 per cent. Unfilled orders have increased and now are considerably ahead of this time last year. The response to the new tractor models has been such that it is difficult to keep up with orders. Dealers' sales are satisfactory and stocks appear to be moving well, according to the report.

The sudden invasion of Holland and Belgium and the possibility of more European nations becoming involved in the war has upset steel export markets temporarily for American producers. Cleveland sellers had found Holland a generous buyer, particularly in light flat rolled steel. Partly offsetting the loss of this trade will be inability of Belgian mills to continue exporting. Aggregate foreign demand for steel is expected to come back strong within a month or six weeks, led by Allied requirements for heavy steel. Although some export authorities believe foreign sales of all commodities have already reached this year's peak, it is likely that steel will gain in relative importance. Relaxation of the "cash and carry" provisions and liberal credit aid to the Allies are regarded as inevitable.

On the domestic side, widening of the European conflagration will expedite a number of expansion programs which have been hanging fire.

Steel sellers at CLEVELAND foresee a possible tight situation in the latter part of June, especially if automobile companies come into the market

heavily. The current rate of good activity is being maintained without much auto buying and with little or no support from the railroads. The latter will have large programs before the end of this year and will push their buying forward if possibilities of a steel shortage or price advances appear likely.

Inventories of miscellaneous steel consumers in general are higher than they were last September, according to sellers at Cleveland. Steel producers themselves are carrying sizable stocks of certain raw materials, particularly tin.

Volume of incoming specifications against low priced sheets and strip received by Philadelphia sellers in the past week was considerably below that of the preceding week. It is estimated that approximately 30 to 50 per cent of outstanding commitments on this material are covered by rolling specifications. Sellers continue to make a strong effort to drive in specifications, but response of larger users is lagging. This decrease in sheet and strip specifications was cancelled by a slight gain in merchant bar, standard pipe and plate sales, which brought the week's total volume up to highest level experienced this year. Requirements of a local shipyard, estimated at about 50,000 tons of plates, are expected to be placed shortly. Another district yard is drawing up specifications covering two cruisers. Requirements of these two boats is put at about 7000 tons, including a substantial tonnage of heat treated material. Another district plant will shortly place a substantial tonnage of alloy steel, for use on a Government project.

PRICES

... June 30 deadline on sheet and strip specifications emphasized

BECAUSE of World War conditions it is unlikely that steel companies will have difficulty in holding to the June 30 deadline for shipment of low-priced sheet and strip tonnage. Although large customers are tardy in sending in specifications, steel makers assert they are more than ever adamant on the question of no carryover on bargain flat rolled tonnage. Meanwhile, the singular effect of the invasion of Holland and Belgium may be to stiffen domestic prices of concrete bars and pipe as well as all export quotations.

PIG IRON

... Sellers see war as factor hard to measure

EXPECTATIONS of a substantial improvement in demand, traceable in part to events abroad, are strengthening among pig iron sellers but new orders so far are not substantial, except for export to the Allies, and domestic requirements show only spotty improvement. Low consumer and producer inventories at points such as CLEVELAND, PITTSBURGH and elsewhere will be a significant factor when the expected upturn comes.

The export situation has been further complicated by Germany's invasion of the Low Countries and the possible spread of war to the Mediterranean. Ship space has been somewhat easier to obtain in the last few days.

Shipments in May are ahead of April in most areas. Sanitary ware makers are more active and radiator plants have gained. Jobbing foundries in the NEW YORK area and most other districts are no busier than a month ago. CHICAGO sellers look for moderate improvement in shipments during May and report foundries supplying tractor and implement plants more active. Another blast furnace has been blown in at Carnegie-Illinois Steel Corp.'s South works.

New buying continues light at PHILADELPHIA, and in the NEW ENGLAND area where shipments against old contracts continue light. One Midwest furnace is booked solid until Aug. 1. Buyers and sellers from all districts last week attended the American Foundrymen's Association convention at Chicago.

PLATES

... Shipbuilding tonnage and construction projects aid demand

PLATE specifications at PITTSBURGH have expanded somewhat above the volume of a month ago. Some of this improvement has been due to release of suspensions on old orders. Most of the gain, however, springs from shipbuilding and delayed construction projects, although it is noted that tank makers are more active. The change in events in Europe is expected to be reflected in a more active plate market both from a domestic and export standpoint.

Orders at CLEVELAND and YOUNGSTOWN recently show wide diversification. Makers of steam shovels, road rollers, cranes and tank boiler fabricators, are among the buyers. Individually, tonnages are moderate in size.

Demand from miscellaneous sources in EASTERN PENNSYLVANIA in the past week showed a slight improvement, but the week's total new business was still comparatively poor. Considerable shipyard business is in the offing, including 50,000 tons for commercial boats from one builder and about 7000 tons from another interest for two cruisers. The week's developments abroad have further restricted plate export markets.

Ten days ago inquiries had begun to come in again from Holland shipbuilding firms, but this important market for ship plate is lost for the present as was the equally important Scandinavian market a month ago. Thus far plate inquiries from South America and South Africa have not been large, with the exception of two state railway inquiries. Inquiries for plate fabricating machinery have been received from the Dutch East Indies, but plate inquiries from this point are unreported. Export plate prices are holding firm in the absence of any real test.

SHIPBUILDING

... Sinclair Refining Co. orders 10 tankers, taking 38,000 tons of steel

SINCLAIR REFINING CO., NEW YORK, principal operating subsidiary of Consolidated Oil Corp., has awarded contracts for 10 high-speed tanker vessels, aggregating more than 130,000 dead-weight tons. The expenditure involved is about \$25,000,000. About 38,000 tons of steel will be required.

Bethlehem Steel Co.'s shipbuilding division will build four 10,000-ton and two 15,000-ton tankers. Federal Shipbuilding & Dry Dock Co. was awarded a contract for four 15,000-ton boats. Early deliveries are required under both contracts. Approximate bulk cargo capacity of the 15,000-ton boats is 120,000 bbl., and of the 10,000-ton 90,000 bbl.

H. F. Sinclair, chairman of Consolidated, said that the company had in mind not only its coastwise requirements, but also provisions for transporting Venezuelan, Mexican and other foreign oil.

BOLTS, NUTS AND RIVETS

... Cleveland maker reaffirms current prices for third quarter

LAMSON & SESSIONS CO., Cleveland, has reaffirmed all present bolt and nut prices for third quarter shipment. All producers at CLEVELAND report volume improving and prices firming up. Optimism has been created by possibilities that the lag in automotive production may be short while railroad buying shows signs of gaining. Widening of the European conflagration is expected to result in increased export demand ultimately, although no great immediate benefit can be seen.

... EXPORT TRADE ...

... Spread of the war expected to increase buying by Allies

THE extension of the war zone to Holland and Belgium has created additional complications for American steel exporters. As was the case when Norway and Denmark were invaded, orders were en route to Holland, which had to be turned back. In at least one instance tin plate was being loaded on a boat when the news of the fresh invasion was received.

Holland has recently been a good customer of the United States mills. Some of its orders are not yet processed and under the existing circumstances are being held up.

Belgium has recently been a substantial supplier of steel to the British. Prior to the war Great Britain depended on both Germany and Belgium for ingots and semi-finished steel, and when war broke out Belgium is said to have increased her allotments to Britain to a total of about 200,000 tons a month. Some or all of this might be sought in the United States in the event that Belgium is no longer able to supply Britain. An inquiry for about 100,000 tons of semi-finished steel from Britain is now being quoted on by American producers. Even before the invasion of Belgium and Holland it was believed that Britain would buy not less than 500,000 tons of semi-finished steel here over the remainder of the year, which amount might be enlarged under the new circumstances.

Steel companies here have a considerable amount of business on their books from countries on the Mediter-

anean, but for some weeks no sales have been made on a c.i.f. basis. Letters of credit have been furnished to be drawn upon when ocean bills of lading or certificates of manufacture are presented. Thus, business from Mediterranean countries is solely for account of the buyer and American mills will run no risk other than loss of the business if war should spread to that area.

Export business continues in good volume, although there has been a little lull as compared with the previous rush. Inquiries are numerous, however, and it is believed that the outlook is promising for a continued rise in total volume even though some countries are probably out of the picture for some time to come.

RAILROAD BUYING

*... Some small car orders placed
... war developments may bring out new programs*

THERE are some in the trade who would not be surprised to see a large freight car building movement materialize as a result of the European war developments, although there have been no signs of such a program up to Tuesday of this week. Cincinnati, New Orleans and Texas Pacific has ordered 75 covered hoppers from Pullman Standard Car Mfg. Co., and Nashville, Chattanooga & St. Louis Railroad has ordered 50 covered hopper cars from the same car builder. These two projects will consume approximately 2000 tons of steel. Louisville & Nashville Railroad has ordered 25 covered hopper cars, the business being placed with Pullman Standard Car Mfg. Co. Pullman Standard also received an order for 100 50-ton flat cars from Chesapeake & Ohio.

Canadian Pacific is taking bids on 25 passenger cars to cost about \$1,500,000.

STRUCTURAL STEEL

... Specifications show some signs of expansion

WITH some increase in the number of new projects and with delayed work coming to the forefront, structural specifications at PITTSBURGH have shown small signs of expansion. Export fabricated business has been on the upgrade and further impetus is expected to be given by recent developments in Europe.

Fabricated structural steel lettings advanced to 22,250 tons and are almost double those of a week ago. The

greatest activity was in the North Atlantic states and includes 6900 tons in Brooklyn for Atlantic Avenue improvements of the Long Island Railroad, sections 1 and 2; 2800 tons for the Eastchester Creek bridge, New York, and 1540 tons for a land plane hangar at the North Beach Airport, New York. On the Pacific Coast 1325 tons was awarded for the Loose-Wiles Biscuit Co. plant at Oakland, Cal.

New structural steel projects are in small lots, with no inquiry larger than 900 tons.

REINFORCING BARS

... Heavy inquiries from Great Britain because of loss of Belgian Supplies

WHILE reinforcing bar prices are still erratic and are ranging from 1.60c. lb. to 1.90c. a lb., major basing points, there are already slight signs that the European situation might be one reason for a tendency toward firming up of quotations. Concrete bar inquiries are literally pouring in from the British Isles, owing to that nation having lost all or at least part of its supplies which had been obtained in Belgium. Eastern Seaboard jobbers are increasing their stocks substantially in expectation that present bargain prices may evaporate quickly.

Reinforcing steel awards total 7050 tons, the largest lettings including 2000 tons at Ocean City, Md., for the Sinepuxent Bay bridge, and 1200 tons for a railroad grade elimination at Syracuse, N. Y.

Among new reinforcing steel projects of 8250 tons is 2000 tons for the District of Columbia armory at Washington and 1500 tons at Camden, N. J., for the Campbell Soup Co.

MERCHANT BARS

... Sales slightly upward with further gains expected

HOT rolled bar sales at PITTSBURGH were pointed upward slightly in the past week, with the promise of further gains as the realization of the latest developments in Europe are brought home. Although order volume in some cases has been under that of a month ago, this condition is not expected to last more than a few days or a week. Meanwhile miscellaneous users, whose stocks are low in view of current conditions, are making an analysis of their inventories and acting accordingly. No small amount of miscellaneous business is undoubtedly going to fabricators who are in possession of Government edu-

cational orders. Such business will now increase substantially with more action to be taken in this country as it regards preparedness program. Further net gains in export buying of bars is expected, as the markets lost will be more than compensated for by the placing of tonnages in this country which formerly came from Belgium.

With several tractor and agricultural implement plants in the CHICAGO district working at virtual capacity, demand for merchant bars of all sizes continues good. Among the other active consumers at the present time at CHICAGO, are forgers, the miscellaneous group of buyers and cold finishing mills.

Demand for specially formed bars is reported well maintained at CLEVELAND. Current business also includes a fair volume from automotive parts makers, the agricultural implement industry, export markets and forging shops.

WIRE PRODUCTS

... Price situation on nails steadier after a period of bargain days

CLEVELAND reports that the price "raid" which started a month ago in the merchant wire product field is now declared "well in hand," although several weak spots still remain. Jobbers are well protected for shipments over the next 30 days. Increased export demand is sighted as the result of European war developments of the past week.

Total wire sales at PITTSBURGH are running ahead of a month ago, major support being furnished by an expansion in wire rod demand. At least part of the improvement is due to export buying, but further domestic increases are expected in view of the serious European situation. There is already evidence that many consumers will take out full coverage against the recent bargain price levels in wire nails. With stocks of manufacturers' wire not unduly large, a pickup in this market is expected to materialize soon. Pittsburgh Steel Co. has been awarded 320 miles of fence including chain link and farm fencing for the Pennsylvania Turnpike. Including the posts, the project will require about 1800 tons of steel.

A substantial increase over the past few weeks has been noticed in the sale of merchant wire products at CHICAGO, this being caused almost entirely by the advent of warmer weather. CHICAGO sellers are anticipating the receipt of large tonnages from rural dealers over the next few weeks. Plants engaged in the manufacture of

springs for automobiles are still busy on 1940 model orders and are looking forward to receipt of plans soon for the 1941 car.

COLD FINISHED BARS

... Prices reaffirmed for third quarter by leading maker

AN important producer of cold finished carbon and alloy bars and shafting has reaffirmed present prices on these products for shipment in the third quarter. Current order volume is slightly better with some expansion in bookings from miscellaneous users and jobbers. Automobile tonnage is unimpressive at present, although companies are specifying against commitments placed earlier.

SEMI-FINISHED STEEL

... War developments expected to expand Allied orders

WITH the total volume of specifications somewhat above the level of a month ago at PITTSBURGH, steel makers are looking for a further upswing in orders as the result of recent events in Europe. The French are inquiring for high grade shell steel, and orders of this type can be expected soon. Great Britain, while buying fairly heavy in this country since last fall, is reported to be seeking additional supplies over and above what had been expected. The stoppage of some or all steel imports from Belgium may make it necessary for England to obtain such supplies in this country. Meanwhile domestic sheet bar users are stepping up their requirements with the promise of more active buying in the immediate future because of current uncertainty. A gain in wire rod demand from Latin American countries has materialized recently, with all signs pointing to a continuation of this improvement.

WAREHOUSE BUSINESS

... Philadelphia and New York sellers reduce galvanized sheets

GALVANIZED sheets in PHILADELPHIA and NEW YORK were reduced \$5 a ton last week in line with mill reduction made during price weakness two weeks ago. Revisions were also made in quantity differentials in PHILADELPHIA and NEW YORK interests reestablished quantity differentials on this item. Previously there was one price in NEW YORK area, covering any quantity.

New PHILADELPHIA quotations are 4.75c. per lb. in lots of less than 10 bundles; 4.50c., for 10 to 49 bundles, and 4.25c. for over 50 bundles. New quotations in NEW YORK area are 5.30c. for 150 lb. and under; 4.30c. for 150 to 1499 lb.; 4.05c. for 1500 to 3499 lb.; 3.90c. for 3500 lb. and over.

... PIPE LINES ...

Pure Oil Co., Muskogee, Okla., plans new 4-in. welded steel pipe line from point near Cumberland to Madill, about 10 miles, for crude oil transmission. Connection will be made at last noted place with pipe line of Texas Empire Pipe Line Co. Main offices of first mentioned company are at Chicago.

Leslie T. Barber, Edmore, Mich., and associates, plan steel pipe line gathering system in recently located natural gas field in Richland Township, near first noted place; also installation of compressor station and other operating facilities.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 21 for steel pipe; also for steel tubing and wrought iron pipe, for Eastern and Western Navy yards (Schedule 15561).

Menarch Gas Co., St. Elmo, Ill., plans pressure pipe line system for natural gas distribution at Brownstown, Ill., including main welded steel pipe line, about seven and one-half miles long, from supply source to city. Control station, meter house and other operating facilities also will be installed. M. M. Garman is manager.

Iowa Public Service Co., Commercial Street, Waterloo, Iowa, plans about 14,000 ft. of 6-in. pipe lines near Sycamore and Mitchell Avenues for gas transmission. Proposed to use either steel or cast iron pressure pipe.

Contracting Officer, Quartermaster Corps, Fort Rosecrans, Point Loma, near San Diego, Cal., closes bids May 21 for steel pipe, brass pipe, valves, etc. (Circular 745-15).

City Council, Pomona, Cal., has let contract to Pacific Southwest Pipe Co., Los Angeles, for 5000 ft. of 4½-in. outside diameter lap-welded plain end steel water pipe.

Lone Star-Trinity Gas Co., Crockett, Tex., has let contract to Frick-Reid Co., Tulsa, Okla., for steel pipe line gathering system in oil field near Grapeland, Houston County, for supply for new recycling plant in that district.

M. M. Redditt, Center, Tex., plans steel pipe line system for local natural gas distribution, including main welded steel pipe line to Joaquin gas field, about 14 miles, source of supply; also control station, meter house and other operating facilities, with service lines and connections. Application will be made soon for franchise.

Construction Quartermaster, Fort Mason, San Francisco, asks bids until May 22 for pipe line system for gasoline transmission and fueling at Hickam Field, T. H., in connection with new hangars to be built soon.

Quartermaster, Letterman General Hospital, San Francisco, asks bids until May 23 for quantity of steel pipe. Also for quantity of brass pipe, fittings, etc. (Circular 486-10).

Northern Natural Gas Co., Ltd., Avenue Building, Saskatoon, Sask., has approved plans for new welded steel pipe line from gas field to city, with installation of local steel pipe line distribution system. Cost close to \$4,000,000, including compressor stations and other operating facilities, with control station and meter house in city. Herbert R. Davis, Liberty Bank Building, Buffalo, is consulting engineer.

Signal Pipe Line Construction Co., Long Beach, Cal., has been awarded construction of 10,925 ft. of 12¾-in. pipe line near Torrence, Cal., by Southern California Gas Co.

Union Oil Co., Los Angeles, will replace its pipe line between Battles Farm pumping station, southeast of Santa Maria, Cal., and Suey Junction with a 12.75-in. pipe line, 2.5 miles long.

TRADE NOTES

Jersey Steel & Wire Corp., 53 South Street, New York, has leased the factory building at 84 Coit Street, Irvington, N. J., and will manufacture piano wire, stainless steel and nickel alloys. The general sales office is at 53 South Street, New York, with a branch office in Chicago. M. L. Murray, in the wire business for some years, has been appointed vice-president and production manager.

Terry Steam Turbine Co., Hartford, Conn., has appointed the Northwestern Power Equipment Co., 2295 University Avenue, St. Paul, Minn., as sales representative for Terry turbines, gears and turbo-generator units.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	May 14, 1940	May 7, 1940	Apr. 16, 1940	May 16, 1939	1940	1939
Fabricated structural steel awards	22,250	11,400	9,950	10,350	282,060	366,060
Fabricated plate awards	1,920	310	4,105	880	57,095	68,180
Steel sheet piling awards	425	0	1,505	665	16,290	21,605
Reinforcing bar awards	7,050	4,220	10,500	8,800	155,650	185,745
Total Letting of Construction Steel..	31,645	15,930	26,060	20,695	511,095	641,590

IRON AND STEEL SCRAP

... Composite rises 83c. to \$17.58, sharpest gain this year.

MAY 14—Contrary to the reaction in the stock market, the rapid increase in the war tempo in Europe has tended to strengthen all scrap markets and bullish sentiment is evident throughout the country. In some sections like Chicago, brokers are paying as much as \$1 higher to cover the last mill sale, made the week before. Scrap has become increasingly more difficult to obtain as dealers hold on to their supplies in expectation of a further rise. THE IRON AGE composite price has risen 83c., from \$16.75 to \$17.58, the sharpest gain in the average since the declaration of hostilities last September. Principal factor was the \$1.50 rise in the average quotation of No. 1 heavy melting steel at Pittsburgh. At Chicago No. 1 is nominally up 50c., as is the situation at Philadelphia. Undercover transactions at Youngstown warrant an advance of \$1 there and Cleveland prices made a like advance. Detroit buying prices have been advanced from 50c. to \$1. Cincinnati dealers are offering 25c. more for supplies. In some centers prices are nominally unchanged in the absence of test, although sentiment is strong. The composite price is now back to within a few cents of the level prevailing in early January, which represented the high for the year, although it is still far from the 1939 peak of \$22.50, reached on Oct. 2.

Pittsburgh

With brokers paying as much as \$18.50 for No. 1 steel and with sales having been made into consumption at and higher than this level, No. 1 is quoted this week at \$18.50 to \$19 a ton, up \$1.50 a ton from a week ago. A local mill has sold a premium grade of No. 1 scrap into consumption at higher than the regular No. 1 steel quotations. In the absence of railroad lists, railroad heavy melting is nominally quoted at \$19 to \$19.50 a ton. Steel rails are quoted nominally at \$19.50 to \$20 a ton and, although there is no open-hearth consumption nearly all steel foundries are paying higher than these prices.

Chicago

The leading buyer here recognized the strength of the market by purchasing a tonnage last week at \$16.50. Brokers are paying up to \$17.50 to cover on this and lower-priced orders. The Illinois Central sold about 1000 tons of heavy melting steel last week for \$18.20 a gross ton delivered in the Chicago district. Rising mill operations and an apparent shortage on the part of leading brokers may force this market still higher. Dealers are frankly speculating and are holding ton-

nages for still higher prices. Virtually all prices are nominal this week because broker-dealer transactions are taking place at a much higher level than previous mill sales.

Philadelphia

The change in the pace of the war last week gave rise to a spasm of bullishness at mid-week here and business was done at prices ranging from \$17 to \$17.50 on No. 1 steel. The situation quieted down considerably toward the close of the week as the first flush of excitement passed. Cast items and machine shop turnings also moved higher during the activity. There is still some unsatisfied mill demand, but brokers are not overly anxious to sell in view of the difficulty of covering operations in the present market. Up to \$17.25 was paid in the past week by brokers in covering deals. A boat is expected at Port Richmond this week to load 2000 tons of scrap for England. Material for this boat has already been purchased.

Youngstown

Undercover transactions indicated a very strong situation here Tuesday. No. 1 heavy melting at \$18 to \$18.50 per ton, an advance of \$1 over last week's quotation, is merely a nominal advance and not quite up to the level of offers.

Cleveland

No. 1 heavy melting steel is quoted up \$1 a ton to a range of \$17.50 to \$18 this week, fully indicated by activity here Tuesday. Ingot production is at 73 per cent and will go higher. Another important factor is the buying by Canadian interests at Lake ports. The Canadians are offering high prices as an inducement for scrap on docks.

Buffalo

Recent developments in Europe have so strengthened the market as to make any attempt at precise price estimation little more than conjecture. Absence of new buying forces quotations to reflect those prices at which sales were last made. Scrap is becoming increasingly difficult to obtain. More accurate quotations await new purchases.

St. Louis

The scrap iron market is unchanged, as far as prices are concerned, but there is said to be a strong undertone, as a result of strength in other markets. Steel mills are reported to be fairly well fortified with inventories of scrap, but with any pickup in trade would come into the market, brokers feel. Malleable is said to be especially strong. Railroad lists: Louisville & Nashville, 5000 tons; Southern, 4500 tons; Illinois Central, 2900 tons; Missouri Pacific, 1500 tons, and Gulf Coast Lines, 500 tons.

New York

Prices for scrap material on cars are up 50c. almost throughout the list, with the exception of specification iron and steel pipe. This item has been adjusted downward in view of the fact that the

bulk of it in this market is cut up for No. 2 steel scrap. There has been a little more activity in the export market, but buying prices for material delivered to barges are unchanged. When the composite price was falling steadily, exporters were not able to lower buying prices in step and still keep material flowing to barges, and the present upward movement in the composite allows them to reinstate the normal price spread. Boats are being loaded for Japan and Great Britain.

Boston

The advance of No. 1 heavy melting steel scrap at Pittsburgh created a much better feeling among dealers and brokers. There has been a sympathetic advance in local yard quotations on such material, as well as steel turnings. However, the movement of all kinds of scrap continues limited so far as the domestic market is concerned. The loading of two boats here and prospects of one loading at Providence within the near future serve to hold the export market in the center of the scrap stage. The export price on No. 1 heavy melting steel holds firm at \$15 a ton, delivered dock, but No. 2 steel is easier, recent purchases having been made at \$13.50 a ton, delivered dock, a drop of about 50c. a ton as compared with May 1.

Toronto

Intense interest, increased demand and firm prices feature Canadian iron and steel scrap markets. While offerings to dealers are improving steadily due to heavier shipments from the rural districts and better offerings from automobile wreckers, supplies are doing only little better than taking care of current demands of the melters. Foundries are still keenly interested in cast scrap and stove plate. Imports of cast scrap continue heavy, with indications that big shipments will be made to Canadian points from Buffalo and Detroit during the summer months.

Cincinnati

The district scrap market tends more bullish in anticipation of better demand following the increase of war activity abroad. Mill attitude has changed from one of apathy to one of active interest, although no definite contracting has been reported.

Birmingham

An unexpected firmness developed in the scrap market during the week-end, with prices being advanced 50c. on Nos. 1 and 2 heavy melting. The entrance of large buyers into the market which moved a very substantial volume into plant yards was given as the reason for the advance.

Detroit

Prices in the Detroit area have advanced 50c. to \$1 a ton in the past week, largely because of speculative pressure, but with an increased ingot rate and continued inquiries and mill buying playing a prominent part. A major auto body concern offered more than 200 cars of bundles for bids Wednesday of this week and the outcome of the sale was watched with interest locally.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$18.50 to \$19.00
Railroad heavy melting	19.00 to 19.50
No. 2 heavy melting	16.75 to 17.25
Railroad scrap rails	19.50 to 20.00
Rails 3 ft. and under	22.00 to 22.50
Comp. sheet steel	18.50 to 19.00
Hand bundled sheets	17.50 to 18.00
Heavy steel axle turn.	16.50 to 17.00
Machine shop turnings	12.00 to 12.50
Short shov. turnings	13.00 to 13.50
Mixed bor. & turn.	9.25 to 9.75
Cast iron borings	9.25 to 9.75
Cast iron carwheels	20.00 to 20.50
Heavy breakable cast.	16.00 to 16.50
No. 1 cupola cast	18.50 to 19.00
RR. knuckles & coup.	22.00 to 22.50
Rail coil springs	22.00 to 22.50
Rail leaf springs	22.00 to 22.50
Rolled steel wheels	22.00 to 22.50
Low phos. billet crops	22.50 to 23.00
Low phos. punching	21.50 to 22.00
Low phos. heavy plate	20.00 to 20.50
Railroad malleable	22.00 to 22.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$17.00 to \$17.50
No. 2 hvy. mltng. steel	15.50 to 16.00
Hydraulic bund., new	17.00 to 17.50
Hydraulic bund., old	14.00 to 14.50
Steel rails for rolling	20.50 to 21.00
Cast iron carwheels	20.50 to 21.00
Hvy. breakable cast.	19.00
No. 1 cupola cast	20.00 to 20.50
Mixed yard (f'd'y) cast	16.50
Stove plate (steel wks.)	15.00 to 15.50
Railroad malleable	21.00 to 22.00
Machine shop turn.	10.00
No. 1 blast furnace	9.00 to 9.50
Cast borings	10.50 to 11.00
Heavy axle turnings	14.00 to 14.50
No. 1 low phos. hvy.	21.00 to 21.50
Couplers & knuckles	21.00 to 21.50
Rolled steel wheels	21.00 to 21.50
Steel axles	22.50 to 23.00
Shafting	22.00 to 22.50
Spec. iron & steel pipe	16.00 to 16.50
Cast borings (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton	
Hvy. mltng. steel	\$16.50 to \$17.00
Auto. hvy. mltng. steel alloy free	15.50 to 16.00
No. 2 auto steel	13.25 to 13.75
Shoveling steel	16.50 to 17.00
Factory bundles	16.00 to 16.50
Dealers' bundles	14.50 to 15.00
No. 1 busheling	15.50 to 16.00
No. 2 busheling, old	7.50 to 8.00
Rolled carwheels	19.00 to 19.50
Railroad tires, cut	19.00 to 19.50
Railroad leaf springs	18.50 to 19.00
Steel coup. & knuckles	19.00 to 19.50
Axle turnings	15.00 to 15.25
Coil springs	19.25 to 19.75
Axle turn. (elec.)	16.50 to 17.00
Low phos. punchings	18.50 to 19.00
Low phos. plates 12 in. and under	18.00 to 18.50
Cast iron borings	10.00 to 10.50
Short shov. turn.	11.25 to 11.75
Machine shop turn.	10.75 to 11.25
Rerolling rails	18.50 to 19.00
Steel rails under 3 ft.	18.75 to 19.25
Steel rails under 2 ft.	20.50 to 21.00
Angle bars steel	19.50 to 20.00
Cast iron carwheels	18.00 to 18.50
Railroad malleable	19.75 to 20.25
Agric. malleable	14.25 to 14.75

Per Net Ton

Iron car axles	23.00 to 23.50
Steel car axles	22.00 to 22.50
Locomotive tires	14.50 to 15.00
Pipes and flues	11.00 to 11.50
No. 1 machinery cast.	16.00 to 16.50
Clean auto. blocks	17.50 to 18.00
No. 1 railroad cast	14.50 to 15.00
No. 1 agric. cast	13.00 to 13.50
Stove plate	11.00 to 11.50
Grate bars	11.00 to 11.50
Brake shoes	11.00 to 11.50

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$18.00 to \$18.50
No. 2 hvy. mltng. steel	17.00 to 17.50
Low phos. plate	20.50 to 21.00
No. 1 busheling	17.25 to 17.75
Hydraulic bundles	17.50 to 18.00
Machine shop turn.	11.00 to 11.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$17.50 to \$18.00
No. 2 hvy. mltng. steel	16.50 to 17.00

Comp. sheet steel	17.00 to 17.50
Light bund. stampings	14.50 to 15.00
Drop forge flashings	16.00 to 16.50
Machine shop turn.	10.00 to 10.50
Short shov. turn.	10.50 to 11.00
No. 1 busheling	17.00 to 17.50
Steel axle turnings	16.00 to 16.50
Low phos. billet and bloom crops	22.00 to 22.50
Cast iron borings	10.50 to 11.00
Mixed bor. & turn.	10.50 to 11.00
No. 2 busheling	10.50 to 11.00
No. 1 cupola cast	20.50 to 21.00
Railroad grate bars	14.25 to 14.75
Stove plate	14.25 to 14.75
Rails under 3 ft.	21.50 to 22.00
Rails for rolling	19.50 to 20.00
Railroad malleable	21.50 to 22.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$16.50 to \$17.00
No. 2 hvy. mltng. steel	14.50 to 15.00
Scrap rails	18.50 to 19.00
New hvy. b'ndled sheets	14.50 to 15.00
Old hydraulic bundles	12.50 to 13.00
Drop forge flashings	14.50 to 15.00
No. 1 busheling	14.50 to 15.00
Machine shop turn.	10.50 to 11.00
Shov. turnings	11.50 to 12.00
Mixed bor. & turn.	10.00 to 10.50
Cast iron borings	10.00 to 10.50
Knuckles & couplers	19.50 to 20.50
Coil & leaf springs	19.50 to 20.50
Rolled steel wheels	19.50 to 20.50
No. 1 machinery cast.	18.50 to 19.00
No. 1 cupola cast	17.50 to 18.00
Stove plate	14.50 to 15.00
Steel rails under 3 ft.	21.50 to 22.00
Cast iron carwheels	17.50 to 18.00
Railroad malleable	19.00 to 19.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	\$14.00 to \$14.50
No. 1 hvy. melting	13.50 to 14.00
No. 2 hvy. melting	12.25 to 12.75
No. 1 locomotive tires	14.75 to 15.25
Misc. stand. sec. rails	15.00 to 15.50
Railroad springs	16.25 to 16.75
Bundled sheets	9.00 to 9.50
No. 1 busheling	13.00 to 13.50
Cast bor. & turn.	5.00 to 5.50
Machine shop turn.	6.50 to 7.00
Heavy turnings	9.25 to 9.75
Rails for rolling	17.50 to 18.00
Steel car axles	18.50 to 19.00
No. 1 RR wrought	10.00 to 10.50
No. 2 RR wrought	12.50 to 13.00
Steel rails under 3 ft.	18.00 to 18.50
Steel angle bars	14.75 to 15.25
Cast iron carwheels	15.50 to 16.00
No. 1 machinery cast.	14.75 to 15.25
Railroad malleable	16.00 to 16.50
Breakable cast	14.00 to 14.50
Stove plate	10.50 to 11.00
Grate bars	9.50 to 10.00
Brake shoes	10.00 to 10.50

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	\$12.75 to \$13.25
No. 2 hvy. mltng. steel	10.75 to 11.25
Scrap rails for mltng.	17.25 to 17.75
Loose sheet clippings	8.25 to 8.75
Hydrau. b'ndled sheets	12.25 to 12.75
Cast iron borings	4.00 to 4.50
Machine shop turn.	5.25 to 5.50
No. 1 busheling	9.25 to 9.75
No. 2 busheling	3.25 to 3.50
Rails for rolling	18.75 to 19.25
No. 1 locomotive tires	14.25 to 14.75
Short rails	19.25 to 19.75
Cast iron carwheels	14.75 to 15.25
No. 1 machinery cast.	16.25 to 16.75
No. 1 railroad cast	14.25 to 14.75
Burnt cast	8.00 to 8.50
Stove plates	8.00 to 8.50
Agricul. malleable	12.75 to 13.25
Railroad malleable	15.75 to 16.25
Mixed hvy. cast	13.75 to 14.25

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	\$15.00
No. 2 hvy. melting steel	14.00
No. 1 busheling	14.00
Scrap steel rails	15.00
Steel rails under 3 ft.	16.00
Rails for rolling	16.50
Long turnings	5.00
Cast iron borings	7.50
Stove plate	10.00
Steel axles	18.00
No. 1 RR wrought	14.00
No. 1 cast	16.00
No. 2 cast	12.50
Cast iron carwheels	13.00
Steel car wheels	16.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 hvy. mltng. industrial steel	\$14.25 to \$14.75
No. 2 hvy. mltng. steel	13.25 to 13.75
Borings and turnings	8.75 to 9.25
Long turnings	8.75 to 9.25
Short shov. turnings	10.00 to 10.50
No. 1 machinery cast.	18.00 to 18.50
Automotive cast	18.00 to 18.50
Hvy. breakable cast	14.50 to 15.00
Stove plate	11.25 to 11.75
Hydraul. comp. sheets	15.50 to 16.00
New factory bushel	14.00 to 14.50
Sheet clippings	10.75 to 11.75
Flashings	14.00 to 14.50
Low phos. plate scrap	15.50 to 16.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	\$13.00 to \$13.50
No. 2 hvy. mltng. steel	11.00 to 11.50
Hvy. breakable cast	14.50 to 15.00
No. 1 machinery cast	16.50 to 17.00
No. 2 cast	13.00 to 13.50
Stove plate	11.00 to 11.50
Steel car axles	19.00 to 20.00
Shafting	19.00 to 20.00
No. 1 RR. wrought	14.00 to 15.00
No. 1 wrought long	12.50 to 13.00
Spec. iron & steel pipe	10.50 to 11.00
Rails for rolling	15.50 to 16.00
Clean steel turnings*	5.00
Cast borings*	5.00 to 5.50
No. 1 blast furnace	5.00 to 5.50
Cast borings (chem.)	Nominal
Unprepared yard scrap	7.00 to 7.50
Light iron	5.00 to 5.50

Per gross ton delivered local foundries:
No. 1 machin. cast. \$17.00 to \$18.50
No. 2 cast 16.50 to 17.00

* \$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	\$13.00 to \$13.25
Machine shop turn.	5.40
Mixed bor. & turn.	3.15 to 3.50
Bun. skeleton long	9.40
Shafting	17.00 to 17.25
Stove plate	9.75 to 10.00
Cast bor. chemical	8.00 to 8.50

Per gross ton delivered consumers' yards:
Textile cast \$15.50 to \$17.00
No. 1 machine cast. 15.50 to 17.00

Per gross ton delivered dealers' yards:
No. 1 hvy. mltng. steel. \$13.75
No. 2 steel 12.75

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	\$12.00	\$12.00	\$11.00
No. 2 hvy. mltng. steel	11.00	11.00	10.00
Bundles	10.00	10.00	9.00

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel	\$11.50	\$11.00
No. 1 hvy. mltng. steel	11.00	10.50
No. 2 hvy. mltng. steel	9.75	9.25
Mixed dealers steel	8.75	8.25
Drop forge flashings	9.75	9.25
New loose clippings	8.75	8.25
Busheling	6.00	5.50
Scrap pipe	7.75	7.25
Steel turnings	7.25	6.75
Cast borings	6.75	6.25
Machinery cast	20.00	19.00
Dealers' cast	19.00	18.00
Stove plate	14.00	13.00

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel	\$13.50
No. 2 hvy. mltng. steel	\$11.50 to 12.00
No. 2 cast	12.00 to 12.50
Stove plate	10.00 to 10.50

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel	\$15.00
No. 2 hvy. mltng. steel	13.50
Rail (scrap)	1.00
Stove plate	\$8.00 to 8.25

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel	Nominal
No. 2 hvy. mltng. steel	Nominal

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are effected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition.

SEMI-FINISHED STEEL

Billets, Blooms and Slabs
Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are \$2 higher F.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton
Rerolling \$34.00
Forging quality 40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton
Open hearth or bessemer \$34.00

Skelp

Pittsburgh, Chicago Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.
Grooved, universal and sheared 1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Lb.
Pittsburgh, Chicago or Cleveland 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.50c.
Galveston 2.25c.
9/32 in. to 47/64 in. \$3 a net ton higher. Quantity extras apply.

SOFT STEEL BARS

Base per Lb.

Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham 2.15c.
Detroit, delivered 2.25c.
Duluth 2.25c.
Philadelphia, delivered.. 2.47c.
New York 2.49c.
On cars dock Gulf ports 2.50c.
On cars dock Pacific ports 2.80c.

RAIL STEEL BARS

(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham 2.05c.
On cars dock Tex. Gulf ports 2.40c.
On cars dock Pacific ports 2.70c.

IRON BARS

Chicago (common) 2.25c.
Terre Haute, Ind. (common) 2.15c.
Pittsburgh (refined) ... 3.75c.
Pittsburgh (wrought iron) 4.40c.

BILLET STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt. 1.70c. to 1.90c.*
Detroit, delivered 1.80c. to 2.00c.*
On cars dock Tex. Gulf ports 2.20c. to 2.25c.*
On cars dock Pacific ports 2.25c. to 2.30c.

RAIL STEEL REINFORCING BARS

(Straight lengths as quoted by distributors)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham. 1.70c. to 1.90c.*

Detroit, delivered 1.80c. to 2.00c.*
On cars dock Tex. Gulf ports 2.20c. to 2.25c.*

On cars dock Pacific ports 2.25c. to 2.30c.*
*The so-called published price on new billet reinforcing bars is 2.15c. a lb. f.o.b. major basing points and on rail reinforcing bars is 2.00c. a lb. The price range shown above, however, represents the going prices at the present time.

COLD FINISHED BARS AND SHAFTING*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary 2.65c.
Detroit 2.70c.

*In quantities of 20,000 to 39,999 lb.

PLATES

Base per Lb.

Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del. 2.10c.
Philadelphia, del'd 2.15c.
New York, del'd 2.29c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.65c.
Wrought iron plates, P'tg 3.80c.

FLOOR PLATES

Pittsburgh or Chicago. 3.35c.
New York, del'd 3.71c.
On cars dock Gulf ports 3.70c.
On cars dock Pacific ports 4.00c.

STRUCTURAL SHAPES

Base per Lb.

Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham.. 2.10c.
Philadelphia, del'd 2.215c.
New York, del'd 2.27c.
On cars dock Gulf ports 2.45c.
On cars dock Pacific ports 2.75c.

STEEL SHEET PILING

Base per Lb.

Pittsburgh, Chicago or Buffalo 2.40c.
On cars dock Gulf ports 2.85c.
On cars dock Pacific ports 2.95c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton \$40.00
Angle bars, per 100 lb.. 2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton... \$40.00
Light rails (from rail steel) per gross ton.. 39.00

Base per Lb.

Cut spikes 3.00c.
Screw spikes 4.55c.
Tie plates, steel 2.15c.
Tie plates, Pacific Coast ports 2.30c.
Track bolts, to steam railroads 4.15c.
Track bolts to jobbers, all sizes (per 100 counts) 65-5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnesota, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa.; Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS

Hot Rolled

Base per Lb.

Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago 2.10c.
Detroit, delivered 2.20c.
Philadelphia, delivered. 2.27c.
Granite City 2.20c.
On cars dock Pacific ports 2.65c.
Wrought iron sheets, Pittsburgh 4.75c.

*Cold Rolled**

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago 3.05c.
Detroit, delivered 3.15c.
Granite City 3.15c.
Philadelphia, delivered. 3.37c.
On cars dock Pacific ports 3.70c.

*Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. On May 1, these prices were advanced 0.20c. per lb.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham 3.50c.
Philadelphia, del'd 3.67c.
Granite City 3.60c.
On cars dock Pacific ports 4.05c.
Wrought iron sheets, Pittsburgh 7.00c.

Electrical Sheets

(F.o.b. Pittsburgh)

Base per Lb.

Field grade 3.20c.
Armature 3.55c.
Electrical 4.05c.
Motor 4.95c.
Dynamo 5.65c.
Transformer 72 6.15c.
Transformer 65 7.15c.
Transformer 58 7.65c.
Transformer 52 8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary 3.80c.
F.o.b. cars dock Pacific ports 4.35c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland 3.35c.
Detroit, del'd 3.45c.
Granite City 3.45c.
On cars dock Pacific ports 4.00c.

TIN MILL PRODUCTS

Tin Plate

Per Base Box

Standard cokes, Pittsburgh, Chicago and Gary (100 lb.) \$5.00
Standard cokes, Granite City (100 lb.) 5.10

Special Coated Manufacturing Ternes

Per Base Box

Granite City \$4.40
Pittsburgh or Gary ... 4.30

Roofing Terne Plate (F.o.b. Pittsburgh per Package, 112 Sheets)

20x14 in. 20x28 in.

8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

Black Plate, 29 gage and lighter*

Pittsburgh, Chicago and Gary 3.05c.
Granite City 3.15c.
On cars dock Pacific ports, boxed 4.05c.
*Black plate base price applies to 29 gage within certain width and length limitations.

HOT ROLLED STRIP

(Widths up to 12 in.)

Base per Lb.

Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham 2.10c.
Detroit, delivered 2.20c.
On cars dock Pacific ports 2.75c.

Cooperage Stock

Pittsburgh and Chicago 2.20c.

COLD ROLLED STRIP*

Base per Lb.

Pittsburgh, Youngstown or Cleveland 2.80c.
Chicago 2.90c.
Detroit, delivered 2.90c.
Worcester 3.00c.

*Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland 2.95c.
Detroit, del'd 3.05c.
Worcester 3.35c.

COLD ROLLED SPRING STEEL

	Pittsburgh	Cleveland	Worcester
Carbon 0.26-0.50%	2.80c.	3.00c.	
Carbon 0.51-0.75	4.30c.	4.50c.	
Carbon 0.76-1.00	6.15c.	6.35c.	
Carbon 1.01-1.25	8.35c.	8.55c.	

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

Bright wire 2.60c.
Galvanized wire, base .. 2.60c.
Spring wire 3.20c.

To the Trade

Base per Keg
Standard wire nails \$2.55
Coated nails 2.55
Cut nails, carloads 3.85

Base per 100 Lb.
Annealed fence wire \$3.05
Woven wire fence, 15½ gage and heavier base col. 67
Fence posts (carloads), base col. 69
Single loop bale ties, base col. 56
Galvanized barbed wire on 80-rod spools (carloads) base col. 70
Twisted barless wire, base col. 70
Note: Birmingham base same on above items, except spring wire.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe
Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
F.o.b. Pittsburgh only on wrought iron pipe.

In.	Black Galv.
1/2	56 36
3/4	59 43 1/2
1	63 54
1 1/4	66 58
1 1/2	68 52
1 to 3	68 52

In.	Black Galv.
1/2 & 3/4	+9 +30
1	24 6 1/2
3/4	30 13
1 & 1 1/4	34 19
1 1/2	38 21 1/2
2	37 1/2 21

In.	Black Galv.
1/2	61 52 1/2
3/4	64 55 1/2
1	66 57 1/2
1 1/4	65 55 1/2
1 1/2	64 55 1/2
2	63 54
2 1/2	61 52 1/2
3	60 51 1/2
3 1/2	59 50 1/2
4	58 49 1/2
4 1/2	57 48 1/2
5	56 47 1/2
5 1/2	55 46 1/2
6	54 45 1/2
6 1/2	53 44 1/2
7	52 43 1/2
7 1/2	51 42 1/2
8	50 41 1/2
8 1/2	49 40 1/2
9	48 39 1/2
9 1/2	47 38 1/2
10	46 37 1/2
10 1/2	45 36 1/2
11	44 35 1/2
11 1/2	43 34 1/2
12	42 33 1/2

In.	Black Galv.
1/2	61 52 1/2
3/4	64 55 1/2
1	66 57 1/2
1 1/4	65 55 1/2
1 1/2	64 55 1/2
2	63 54
2 1/2	61 52 1/2
3	60 51 1/2
3 1/2	59 50 1/2
4	58 49 1/2
4 1/2	57 48 1/2
5	56 47 1/2
5 1/2	55 46 1/2
6	54 45 1/2
6 1/2	53 44 1/2
7	52 43 1/2
7 1/2	51 42 1/2
8	50 41 1/2
8 1/2	49 40 1/2
9	48 39 1/2
9 1/2	47 38 1/2
10	46 37 1/2
10 1/2	45 36 1/2
11	44 35 1/2
11 1/2	43 34 1/2
12	42 33 1/2

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall.

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

In.	Seamless	Lap Weld
1/2	59 51 1/2	59 51 1/2
3/4	63 55 1/2	63 55 1/2
1	66 57 1/2	66 57 1/2
1 1/4	65 55 1/2	65 55 1/2
1 1/2	64 55 1/2	64 55 1/2
2	63 54	63 54
2 1/2	61 52 1/2	61 52 1/2
3	60 51 1/2	60 51 1/2
3 1/2	59 50 1/2	59 50 1/2
4	58 49 1/2	58 49 1/2
4 1/2	57 48 1/2	57 48 1/2
5	56 47 1/2	56 47 1/2
5 1/2	55 46 1/2	55 46 1/2
6	54 45 1/2	54 45 1/2
6 1/2	53 44 1/2	53 44 1/2
7	52 43 1/2	52 43 1/2
7 1/2	51 42 1/2	51 42 1/2
8	50 41 1/2	50 41 1/2
8 1/2	49 40 1/2	49 40 1/2
9	48 39 1/2	48 39 1/2
9 1/2	47 38 1/2	47 38 1/2
10	46 37 1/2	46 37 1/2
10 1/2	45 36 1/2	45 36 1/2
11	44 35 1/2	44 35 1/2
11 1/2	43 34 1/2	43 34 1/2
12	42 33 1/2	42 33 1/2

CAST IRON WATER PIPE

In.	Per Net Ton
6-in. and larger, del'd	
Chicago	\$54.80
6-in. and larger, del'd	
New York	52.20
6-in. and larger, Birm-	
ingham	46.00
6-in. and larger, f.o.b.	
dock, San Francisco or	
Los Angeles or Seattle	56.00

4-in. f.o.b. dock, San Francisco, Los Angeles or Seattle 59.00

Class "A" and gas pipe, \$3 extra
4-in. pipe is \$3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$15, Birmingham, and \$53.90 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts
(F.o.b. Pittsburgh, Cleveland Birmingham or Chicago)

In.	Black Galv.
1/2	61 52 1/2
3/4	64 55 1/2
1	66 57 1/2
1 1/4	65 55 1/2
1 1/2	64 55 1/2
2	63 54
2 1/2	61 52 1/2
3	60 51 1/2
3 1/2	59 50 1/2
4	58 49 1/2
4 1/2	57 48 1/2
5	56 47 1/2
5 1/2	55 46 1/2
6	54 45 1/2
6 1/2	53 44 1/2
7	52 43 1/2
7 1/2	51 42 1/2
8	50 41 1/2
8 1/2	49 40 1/2
9	48 39 1/2
9 1/2	47 38 1/2
10	46 37 1/2
10 1/2	45 36 1/2
11	44 35 1/2
11 1/2	43 34 1/2
12	42 33 1/2

On the above items with the exception of plow bolts, there is an additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

In.	Black Galv.
1/2	61 52 1/2
3/4	64 55 1/2
1	66 57 1/2
1 1/4	65 55 1/2
1 1/2	64 55 1/2
2	63 54
2 1/2	61 52 1/2
3	60 51 1/2
3 1/2	59 50 1/2
4	58 49 1/2
4 1/2	57 48 1/2
5	56 47 1/2
5 1/2	55 46 1/2
6	54 45 1/2
6 1/2	53 44 1/2
7	52 43 1/2
7 1/2	51 42 1/2
8	50 41 1/2
8 1/2	49 40 1/2
9	48 39 1/2
9 1/2	47 38 1/2
10	46 37 1/2
10 1/2	45 36 1/2
11	44 35 1/2
11 1/2	43 34 1/2
12	42 33 1/2

On stove bolts freight is allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

Large Rivets

(1/2 in. and larger)
Base per 100 Lb.

In.	Black Galv.
1/2	61 52 1/2
3/4	64 55 1/2
1	66 57 1/2
1 1/4	65 55 1/2
1 1/2	64 55 1/2
2	63 54
2 1/2	61 52 1/2
3	60 51 1/2
3 1/2	59 50 1/2
4	58 49 1/2
4 1/2	57 48 1/2
5	56 47 1/2
5 1/2	55 46 1/2
6	54 45 1/2
6 1/2	53 44 1/2
7	52 43 1/2
7 1/2	51 42 1/2
8	50 41 1/2
8 1/2	49 40 1/2
9	48 39 1/2
9 1/2	47 38 1/2
10	46 37 1/2
10 1/2	45 36 1/2
11	44 35 1/2
11 1/2	43 34 1/2
12	42 33 1/2

Small Rivets

(7/16 in. and smaller)
Per Cent Off List

In.	Black Galv.
1/2	61 52 1/2
3/4	64 55 1/2
1	66 57 1/2
1 1/4	65 55 1/2
1 1/2	64 55 1/2
2	63 54
2 1/2	61 52 1/2
3	60 51 1/2
3 1/2	59 50 1/2
4	58 49 1/2
4 1/2	57 48 1/2
5	56 47 1/2
5 1/2	55 46 1/2
6	54 45 1/2
6 1/2	53 44 1/2
7	52 43 1/2
7 1/2	51 42 1/2
8	50 41 1/2
8 1/2	49 40 1/2
9	48 39 1/2
9 1/2	47 38 1/2
10	46 37 1/2
10 1/2	45 36 1/2
11	44 35 1/2
11 1/2	43 34 1/2
12	42 33 1/2

Cap and Set Screws

(Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.)

In.	Black Galv.
1/2	61 52 1/2
3/4	64 55 1/2
1	66 57 1/2
1 1/4	65 55 1/2
1 1/2	64 55 1/2
2	63 54
2 1/2	61 52 1/2
3	60 51 1/2
3 1/2	59 50 1/2
4	58 49 1/2
4 1/2	57 48 1/2
5	56 47 1/2
5 1/2	55 46 1/2
6	54 45 1/2
6 1/2	53 44 1/2
7	52 43 1/2
7 1/2	51 42 1/2
8	50 41 1/2
8 1/2	49 40 1/2
9	48 39 1/2
9 1/2	47 38 1/2
10	46 37 1/2
10 1/2	45 36 1/2
11	44 35 1/2
11 1/2	43 34 1/2
12	42 33 1/2

Alloy Steel

Alloy Steel Blooms, Billets and Slabs

In.	Black Galv.
1/2	61 52 1/2
3/4	64 55 1/2
1	66 57 1/2
1 1/4	65 55 1/2
1 1/2	64 55 1/2
2	63 54
2 1/2	61 52 1/2
3	60 51 1/2
3 1/2	59 50 1/2
4	58 49 1/2
4 1/2	57 48 1/2
5	56 47 1/2
5 1/2	55 46 1/2
6	54 45 1/2
6 1/2	53 44 1/2
7	52 43 1/2
7 1/2	51 42 1/2
8	50 41 1/2
8 1/2	49 40 1/2
9	48 39 1/2
9 1/2	47 38 1/2
10	46 37 1/2
10 1/2	45 36 1/2
11	44 35 1/2
11 1/2	43 34 1/2
12	42 33 1/2

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Base price, \$54.00 a gross ton.

Alloy Steel Bars
F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base 2.70c. Delivered, Detroit 2.80c.

S.A.E. Series Alloy Differential per 100 Lb.

In.	Black Galv.
1/2	61 52 1/2
3/4	64 55 1/2
1	66 57 1/2
1 1/4	65 55 1/2
1 1/2	64 55 1/2
2	63 54
2 1/2	61 52 1/2
3	60 51 1/2
3 1/2	59 50 1/2
4	58 49 1/2
4 1/2	57 48 1/2
5	56 47 1/2
5 1/2	55 46 1/2
6	54 45 1/2
6 1/2	53 44 1/2
7	52 43 1/2
7 1/2	51 42 1/2
8	50 41 1/2
8 1/2	49 40 1/2
9	48 39 1/2
9 1/2	47 38 1/2
10	46 37 1/2
10 1/2	45 36 1/2
11	44 35 1/2
11 1/2	43 34 1/2
12	42 33 1/2

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. base per lb. Delivered Detroit, 3.45c., carlots.

PIG IRON AND FERROALLOYS

No. 2 Foundry

In.	Black Galv.
1/2	61 52 1/2
3/4	64 55 1/2
1	66 57 1/2
1 1/4	65 55 1/2
1 1/2	64 55 1/2
2	63 54
2 1/2	61 52 1/2
3	60 51 1/2
3 1/2	59 50 1/2
4	58 49 1/2
4 1/2	57 48 1/2
5	56 47 1/2
5 1/2	55 46 1/2
6	54 45 1/2
6 1/2	53 44 1/2
7	52 43 1/2
7 1/2	51 42 1/2
8	50 41 1/2
8 1/2	49 40 1/2
9	48 39 1/2
9 1/2	47 38 1/2
10	46 37 1/2
10 1/2	45 36 1/2
11	44 35 1/2
11 1/2	43 34 1/2
12	42 33 1/2

* Delivered prices on Southern iron for shipment to Northern points are 35c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

In.	Black Galv.
1/2	61 52 1/2
3/4	64 55 1/2
1	66 57 1/2
1 1/4	65 55 1/2
1 1/2	64 55 1/2
2	63 54
2 1/2	61 52 1/2
3	60 51 1/2
3 1/2	59 50 1/2
4	58 49 1/2
4 1/2	57 48 1/2
5	56 47 1/2
5 1/2	55 46 1/2
6	54 45 1/2

For each unit of manganese over 2%, \$1 per ton additional.
Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton
F.o.b. Jackson, Ohio, 5.00
to 5.50%\$27.50
For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carts, Lump Size, on Contract

4 to 6% carbon11.00c.
2% carbon17.50c.
1% carbon18.50c.
0.10% carbon20.50c.
0.06% carbon21.00c.
Spot prices are 1/4c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon\$98.00*
2.50% carbon103.00*
2% carbon108.00*
1% carbon118.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W. del., carload\$2.00
Ferrotungsten, 100 lb. and less2.25
Ferrovanadium, contained V., del'd \$2.70 to \$2.90†
Ferracolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots\$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton\$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton\$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton\$58.50
Ferrophosphorus, electrolytic 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville\$75.00

Ferromolybdenum, per lb. Mo f.o.b. furnace 95c.
Calcium molybdate, per lb. Mo f.o.b. furnace 80c.
Molybdenum oxide briquettes 48-52% Mo per lb. contained Mo f.o.b. Langeloth, Pa. 80c.

*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

*ORES

Lake Superior Ores

Delivered Lower Lake Ports Per Gross Ton
Old range, bessemer, 51.50%\$4.75
Old range, non-bessemer, 51.50%4.60
Mesaba, bessemer, 51.50%4.60
Mesaba, non - bessemer, 51.50%4.45
High phosphorus, 51.50%4.35

Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty Per Unit
Algerian, low P, Cu free, dry, 55 to 58% Fe 14c.
Caucasian, washed, 52% Mn 50c.
African, Indian, 44 to 48% Mn 46c.
African, Indian, 49 to 51% Mn 49c.
Brazilian, 46 to 48% Mn, 47c.
Cuban, del'd, duty free, 51% Mn 62c.
Per Short Ton Unit
Tungsten, Chinese, Wolframite, duty paid, delivered\$23.00 to \$23.50
Tungsten, domestic scheelite del'd 23.00 to 23.50
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)\$19.00
Rhodesian, 45% 22.00
Rhodesian, 48% 26.00 to 27.00

*All foreign ore prices are nominal. War conditions have prevented trading in Swedish and Turkish ores and all quotations have therefore been withdrawn.

FLUORSPAR

Per Net Ton
Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail\$20.00
Domestic, f.o.b. Ohio River landing barges, 20.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines\$20.00 to 22.00

Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid \$25.00 to \$25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines\$31.00
ditto, in bags, f.o.b., same mines\$32.60

FUEL OIL

Per Gal.
No. 3, f.o.b. Bayonne, N. J.5.40c.
No. 6, f.o.b. Bayonne, N. J.3.57c.
No. 5 Bur. Stds., del'd Chicago3.25c.
No. 6 Bur. Stds., del'd Chicago2.75c.
No. 3 distillate, del'd Cleveland5.25c.
No. 4 industrial, del'd Cleveland5.00c.
No. 5 industrial, del'd Cleveland3.75c.
No. 6 industrial, del'd Cleveland3.25c.

COKE

Per Net Ton
Furnace, f.o.b. Connellsville, Prompt\$4.00 to \$4.25
Foundry, f.o.b. Connellsville, Prompt\$5.25 to \$5.50
Foundry, by-product Chicago ovens\$10.50
Foundry, by-product delivered New England\$12.50
Foundry, by-product delivered Newark or Jersey City,\$11.38 to \$11.90
Foundry, by-product Philadelphia\$11.13
Foundry, by-product delivered Cleveland\$11.05
Foundry, by-product delivered Cincinnati\$10.50
Foundry, Birmingham, f.o.b. cars dock Pacific ports\$14.75

REFRACTORIES PRICES

Fire Clay Brick Per 1000 f.o.b. Works
Super-duty brick, at St. Louis\$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois47.50
First quality New Jersey 52.50
Second quality, Pennsylvania, Maryland, Ken-

tucky, Missouri and Illinois42.75
Second quality, New Jersey49.00
No. 1 Ohio39.90
Ground fire clay, per ton 7.10

Silica Brick

Per 1000 f.o.b. Works
Pennsylvania\$47.50
Chicago District55.10
Birmingham47.50
Silica cement per net ton (Eastern)8.55

Chrome Brick

Net per Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester\$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.50.00

Magnesite Brick

Net per Ton
Standard f.o.b. Baltimore and Chester\$72.00
Chemically bonded, f.o.b. Baltimore61.00

Grain Magnesite

Net per Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)(-)*
Domestic, f.o.b. Baltimore and Chester in sacks, 40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk) .. 22.00

* None available.

British and Continental BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports
Ferromanganese, export£17 18s.
Tin plate, per base box32s. to 33s.
Steel bars, open hearth13£ 9s.
Beams, open hearth 12£ 2s. 6d.
Channels, open hearth 12£ 2s. 6d.
Angles, open hearth 12£ 2s. 6d.
Black sheets, No. 24 gage 17£ max.*; 17£ min.**
Galvanized sheets, No. 24 gage 19£ 10s. max.*; 19£ 10s. min.**

* Empire markets only.
** Other than Empire markets.

CONTINENTAL

Per Gross Ton, Belgian France f.o.b. Continental Ports
Bars, merchant1500
Plates1750
Joists1475
Sheets, thin1900

Above prices are minimum base to which 100 francs should be added to cover war risk insurance, freight charges, etc.

WAREHOUSE PRICES

Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	\$3.15	\$3.05	\$3.15	\$3.35	\$3.38	\$3.23	\$3.05	\$3.51	\$3.45	\$3.18	\$3.60	\$3.48	\$4.10
Sheets, cold rolled	4.10	4.10	4.05	4.35	4.40	4.30	4.30	4.58	4.75	4.12	4.95	4.43	6.30
Sheets, galv.	4.75	4.60	4.72	4.75	4.30	4.84	4.45	4.66	4.75	4.95	5.00	4.98	5.25
Strip, hot rolled	3.40	3.40	3.30	3.75	3.76	3.48	3.62	3.86	3.70	3.52	3.83	3.54	4.00
Strip, cold rolled	3.00	3.30	3.20	3.31	3.31	3.20	3.22	3.26	3.26	3.41	3.80	3.68	4.00
Plates	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.47	3.80	3.68	4.00
Structural shapes	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.47	3.80	3.68	4.00
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.62	3.75	3.63	4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, hot rolled SAE 2300	7.20	7.10	7.30	7.31	7.35	7.42	7.10	7.50	7.50	7.47	7.45	7.33	9.40
Bars, hot rolled SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	6.05	6.02	6.00	5.88	8.55
Bars, cold drawn SAE 2300	8.15	8.15	8.15	8.56	8.59	8.45	8.15	8.63	8.63	8.52	8.84	8.38	10.65
Bars, cold drawn SAE 3100	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	7.23	7.12	7.44	6.98	9.80

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, less than 1500 lb., cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galv. sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb.; galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb. Extras for size, quality, etc., apply on above quotations; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galv. sheets, 150 to 1049 lb.

... NON-FERROUS ...

... Week's developments abroad spur buying ... Tin prices rise sharply, but later fall off as fears over Dutch East Indies fail to materialize.

NEW YORK, May 14—Invasion of the Low Countries last week threw the non-ferrous markets into confusion for several days and sales of lead, zinc, copper and tin shot skyward. Probably foremost fear was possibility of interruption of shipments of tin supplies from Far East, producer of 60 per cent of world's tin. A desultory copper market was turned over night into a bull market and prices in the open market spurted to 11.625c. per lb., Connecticut Valley. Mine producers, however, held to the 11.50c. level. Buying

was active as the week closed, and Monday's sales were also in good volume, but demand this morning was rather light. A calm study of the situation, after the excitement had subsided somewhat, caused prices in the open market and smelters' quotations to ease to 11.375c. per lb. on Monday. One weakening feature of the week's developments was closing of several important export outlets. Export shipments of copper in April dropped to 2974 tons from 7517 tons in March, while domestic deliveries rose to 68,665 tons from 64,376 tons in March.

NON-FERROUS PRICES

Cents per lb. for early delivery

	May 8	May 9	May 10	May 11	May 13	May 14
Copper, Electrolytic ¹ *	11.50	11.50	11.50	11.50	11.50	11.50
Copper, Lake	11.50	11.50	11.50	11.50	11.50	11.50
Tin, Straits, New York	47.625	47.625	53.50	...	54.00	53.00
Zin, East St. Louis ²	5.75	5.75	5.75	5.75	5.75	5.75
Lead, St. Louis ³	4.85	4.85	4.85	4.85	4.85	4.85

* Mine producers' quotations only.

¹ Delivered Conn. Valley. Deduct ¼c. for New York delivery. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits, pig	54.00c.	56.50c.
Copper, Lake	13.25c.	12.625c.
Copper, electro	12.75c.	12.625c.
Copper, castings	12.375c.	12.375c.
*Copper sheets, hot-rolled	20.12c.	20.12c.
*Yellow brass sheets	18.31c.	18.31c.
*Seamless brass tubes	21.06c.	21.06c.
*Seamless copper tubes	20.62c.	20.62c.
*Yellow brass rods	14.26c.	14.26c.
Zinc slabs	7.10c.	7.75c.
Zinc sheets, No. 9 casks	12.00c.	13.35c.
Lead, American pig	6.10c.	5.50c.
Lead, bar	8.05c.	8.25c.
Lead, sheets, cut	8.25c.	8.25c.
Antimony, Asiatic	16.00c.	17.00c.
Alum., virgin, 99 per cent plus	20.50c.	21.50c.
Alum., No. 1 remelt, 98 to 99 per cent	18.00c.	18.50c.
Solder, ½ and ½	32.75c.	32.50c.
Babbitt metal, anti-friction grade	22.15c.	22.00c.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33¼; on brass sheets and rods, 40; on brass tubes, 33¼, and copper tubes, 40.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	9.25c.	9.875c.
Copper, hvy. and wire	8.25c.	8.625c.
Copper, light and bottoms	7.375c.	7.875c.
Brass, heavy	5.00c.	5.50c.
Brass, light	4.125c.	4.875c.
Heavy machine composition	7.75c.	8.375c.
No. 1 yel. brass turnings	4.75c.	5.75c.
No. 1 red brass or composition, turnings	7.375c.	8.875c.
Lead, heavy	4.00c.	4.375c.
Cast aluminum	7.75c.	8.75c.
Sheet aluminum	13.00c.	14.00c.
Zinc	3.00c.	3.75c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 19c.-20c. a lb.; No. 12 remelt No. 2 standard, 18c.-19c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, \$176 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 12c. a lb.

Refined output in April was 80,964 tons, off 5331 tons from previous month. Stocks, at close of April, were 169,120 tons, as compared with 159,795 tons at end of March.

Zinc

Prime Western sales last week rose sharply to 8624 tons from 1285 tons in previous week. Shipments for the week were little changed at 3900 tons. Bulk of the buying, brought on by fear of higher prices, was for May, June and July positions. Quotations weathered the turmoil without change at 6.14c. per lb., New York. New situation in Europe has increased possibility of a sizable export movement of American spelter.

Lead

Lead sales in the past week also reflected the bullish interpretation first placed on the developments abroad, and heavy buying of June deliveries materialized on Friday and carried through to Monday. Today's sales were largely of the carlot variety, although some sellers expected the day's quota would be absorbed. On the basis of April statistics, May needs are completely covered and June about 50 per cent. Quotations remained unaltered all week at 5c. per lb., New York.

Tin

Intense activity swept over the tin market on Friday when news of the invasion of the Low Countries broke. In the scramble for nearby metal, Straits prices were driven up almost 6c. per lb. in one day. Most active buyers were the mixed metal manufacturers. Tin plate makers generally had covered before the news broke and showed only mild interest in the market Friday. Fears that Japan might take steps to "protect" the Dutch East Indies, made sellers reluctant to offer metal, adding to the upward pressure on prices. Over the week-end demand slackened considerably and today, reflecting this sudden dearth of interest, prices broke 1c. to 53c. As Friday's buying was mostly in nearby positions, the already rather tight spot position was severely aggravated. Tin plate makers generally are covered for the next six months, some beyond, either in the form of stocks on hand or tin afloat. Cash standard in London this morning were £265 5s.

April Average Prices

The average prices of the major non-ferrous metals in April, based on quotations appearing in THE IRON AGE, were as follows:

	Per Lb.
Electrolytic copper, Conn. Valley	11.50c.*
Lake copper, Eastern delivery	11.50c.
Straits tin, spot, New York	46.96c.
Zinc, East St. Louis	5.75c.
Zinc, New York	6.14c.
Lead, St. Louis	4.92c.
Lead, New York	5.07c.

*Mine producers only.

FABRICATED STEEL

... Lettings in fair volume at 22,250 tons ... New projects drop to 5425 tons from 17,000 tons last week ... Plate awards call for 1920 tons.

AWARDS

NORTH ATLANTIC STATES

- 6960 Tons, Brooklyn, Atlantic Avenue improvements, Long Island Railroad, sections 1 and 2, to American Bridge Co., Pittsburgh.
- 2800 Tons, New York, Eastchester Creek bridge, Triboro Bridge Authority, to Harris Structural Steel Co., Plainfield, N. J.
- 1540 Tons, New York, land plane hangar No. 8, North Beach Airport, to Bethlehem Steel Co., Bethlehem, Pa.
- 550 Tons, Ocean City, Md., bascule bridge, to Phoenix Bridge Co., Phoenixville, Pa.
- 310 Tons, Waterbury, Conn., Scovill Mfg. Co., boiler house extension, to Berlin Construction Co., Berlin, Conn.
- 240 Tons, Syracuse, N. Y., Continental Can Co. building, to Trojan Steel Co., Charleston, W. Va.
- 155 Tons, Lancaster, N. Y., box shop for Hazel Atlas Glass Co., to Bethlehem Steel Co., Bethlehem, Pa.
- 150 Tons, Milford, Conn., Wilbur Cross Parkway bridge, to American Bridge Co., Pittsburgh, Pa.
- 135 Tons, Willington, Conn., Wilbur Cross Parkway bridge, to American Bridge Co., Pittsburgh.
- 120 Tons, Waterbury, Conn., American Brass Co., tube rolling building, to Bethlehem Steel Co., Bethlehem, Pa.
- 110 Tons, Massena, N. Y., Aluminum Co. of America, extension to building 122, to Lackawanna Steel Construction Co., Buffalo.
- 165 Tons, Troy, N. Y., telephone building, to James McKinney & Son, Albany, N. Y.

THE SOUTH

- 725 Tons, Baldwin, La., swing bridge, to Nashville Bridge Co., Nashville, Tenn.
- 675 Tons, Hinds County, Miss., bridge FACM-341, to Virginia Bridge Co., Roanoke, Va.
- 505 Tons, Hortense, Ga., nine bridges, to Virginia Bridge Co., Roanoke, Va.
- 435 Tons, Richmond, Va., Thalheimer Bros. store, to Richmond Structural Steel Co., Richmond, Va.
- 285 Tons, McCreary County, Ky., State bridge, FAS-428, to Nashville Bridge Co., Nashville, Tenn.
- 250 Tons, Moneta, Va., highway bridge, project 678, to Virginia Bridge Co., Roanoke, Va.
- 165 Tons, Louisville, Ky., two buildings for Buckeye Cotton Oil Co., to International Steel Co., Evansville, Ind.

CENTRAL STATES

- 450 Tons, East St. Louis, Ill., factory building for O'Neil-Nester Glass Co., to Mississippi Valley Structural Steel Co., St. Louis, through George A. Barnes, East St. Louis, general contractor.
- 210 Tons, Canton, Ohio, furnace building, Timken Roller Bearing Co., to American Bridge Co., Pittsburgh.
- 155 Tons, Rice County, Minn., State bridge 5337, to Lakeside Bridge & Steel Co., Milwaukee.
- 150 Tons, Blissfield, Mich., bridge, to American Bridge Co., Pittsburgh.
- 125 Tons, Hot Springs, S. D., bridge SAP-72, to Bethlehem Steel Co., Bethlehem, Pa.
- 125 Tons, Oregon, Wis., industrial school for girls, to Theodore Kupfer Steel Co., Madison, Wis.
- 110 Tons, Chippewa County, Wis., State bridge to Wausau Iron Works, Wausau, Wis.

WESTERN STATES

- 1325 Tons, Oakland, Cal., Loose-Wiles Biscuit Co. plant, to Moore Dry Dock Co., Oakland, Cal.

- 800 Tons, Vancouver, Wash., additional buildings for Aluminum Co. of America, to Bethlehem Steel Co., San Francisco.
- 660 Tons, Las Animas, Colo., relocation Atcheson, Topeka & Santa Fe bridge, to American Bridge Co., Pittsburgh.
- 630 Tons, Caddo, Colo., railroad relocation bridge, to American Bridge Co., Pittsburgh.
- 500 Tons, Estes Park, Colo., Bureau of Reclamation Specification 902, to Colorado Fuel & Iron Co., Denver, through S. S. Maggofin, general contractor.
- 475 Tons, Odair, Wash., heating and seat plate assemblies for Grand Coulee Dam, to Schmitt Steel Co., Portland, Ore.
- 360 Tons, Los Angeles, Cal., Union Pacific bridge, to American Bridge Co., Pittsburgh.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

- 450 Tons, Pittsfield, Mass., extension to building 14, General Electric Co.
- 330 Tons, Worcester, Mass., forge shops, Wyman-Gordon Co.
- 300 Tons, Auburn, N. Y., prison cell-block; bids May 23.
- 260 Tons, Sprague, Conn., Shetucket River bridge.
- 140 Tons, Albany, N. Y., office building, Beverwyck Breweries, Inc.
- 130 Tons, Syracuse, N. Y., warehouse for Street Construction Co.
- 120 Tons, Waltham, Mass., garage, Shell Oil Co.
- 110 Tons, New York, National City Bank building.
- 110 Tons, Bethpage, N. Y., warehouse, Grumman Aircraft Engineering Corp.

CAST IRON PIPE

Worcester, Mass., has awarded contract for flanged pipe and fittings to Warren Foundry & Pipe Corp.

West Haverhill, Mass., has under consideration a booster plant, standpipe and other equipment for reinforcing its water distributing system.

Water Department, Tuscaloosa, Ala., W. H. Nicol, water commissioner, plans pipe line extensions in water system in different parts of city and outlying districts; also installation of new pumping equipment at Riverview station and construction of reservoir in vicinity. Cost close to \$200,000.

Water Department, Cherry Street Bridge, Toledo, Ohio, J. H. Jewhurst, Safety Building, director of public service, has approved main pipe lines for water supply, in connection with expansion in waterworks and new supply source, as follows: 60-in., about 1700 ft. in Dearborn Street, from point near Justice and Colorado Streets to Kelsey Street; 42-in., about 5800 ft., from new filtration plant, near Collins Park, in Consaul Street, to Front and Justice Streets; 42-in., about 4200 ft. in Forest, Woodruff and Bancroft Streets; 42-in. in Magnolia Street, from Superior to Erie Avenues. Financing has been arranged through Federal aid. Greeley & Hansen, first noted address and Chicago, are consulting engineers.

Constructing Quartermaster, Westover Field, Northeast Air Base, Chicopee Falls, Mass., closes bids May 21 for cast iron water pipe;

THE SOUTH

- 400 Tons, Elm Grove, W. Va., Big Wheeling Creek State bridge.
- 130 Tons, Spencer, W. Va., bridge No. 1574.

CENTRAL STATES

- 260 Tons, Dearborn, Mich., State grade separation bridge.
- 220 Tons, Kansas City, beef house, Armour & Co.; bids May 20.
- 180 Tons, Kanapolis, Kan., Kanapolis Dam, outlet tunnel.

WESTERN STATES

- 900 Tons, Chittenden, Cal., Pajaro River bridge for Southern Pacific Co.
- 660 Tons, Redcliff, Colo., Eagle River State bridge.
- 600 Tons, Gilman, Colo., bridge on State highway No. 4; bids May 23.
- 250 Tons, Fairbanks, Alaska, Army power plant; bids in.
- 180 Tons, Los Angeles, Sepulveda Dam railroad bridges across Los Angeles River and Bull Creek; bids June 13.
- 102 Tons, Brea, Cal., additional structural steel for Brea Dam; bids June 5.

FABRICATED PLATES

AWARDS

- 1000 Tons, Vancouver, Wash., additional pot shells for Aluminum Co. of America, to Puget Sound Machinery Depot, Seattle.
- 700 Tons, Sunnyvale, Cal., wind tunnel at Moffett Field, to Moore Dry Dock Co., Oakland, Cal.
- 220 Tons, New Brunswick, N. J., 60,000-bbl. tank for Public Service Electric & Gas Co., to Chicago Bridge & Iron Co., Chicago.

SHEET PILING

AWARDS

- 423 Tons, Cleveland, sheet and H-piling for Cuyahoga River improvements, contract No. 32, 244 tons to Carnegie Illinois Steel Corp., Pittsburgh, 179 tons to Bethlehem Steel Co., Bethlehem, Pa. L. A. Wells Construction Co., contractor.

PENDING PROJECTS

- 220 Tons, Los Angeles, Sepulveda Dam railroad bridge across Los Angeles River and Bull Creek; bids June 13.

also galvanized wrought iron pipe, fittings, valves, etc. (Schedule 6905-32).

Wallstenburg, N. C., plans pipe lines for water system and other waterworks installation. Fund of \$41,784 has been secured through Federal aid for this and sewage system.

St. Petersburg, Fla., plans pipe line extensions in water system to new water source at Weekiwachee Springs. Wiedeman & Singleton, Candler Building, Atlanta, Ga., are consulting engineers.

Yellville, Ark., plans pipe line extensions in water system and other waterworks installation, including 50,000-gal. steel standpipe. Fund of \$45,000 has been arranged through Federal aid.

Los Angeles Department of Water and Power has awarded 35,000 ft. of 6-in. and 20,000 ft. of 8-in. pipe to American Cast Iron Pipe Co., Los Angeles, and 15,000 ft. of 6-in. pipe to American Cast Iron Pipe Co., Los Angeles.

San Diego, Cal., has awarded 288 ft. of 6-in. and 4716 ft. of 12-in. pipe to United States Pipe & Foundry Co., San Francisco.

Fresno, Cal., has taken bids on 4000 ft. of 4-in., 10,000 ft. of 6-in., 1000 ft. of 8-in. and 1000 ft. of 10-in. pipe.

Department of Interior, Indian Irrigation Division, San Francisco, will ask bids May 20 for a domestic water distribution system with mains, service, fittings and valves, up to individual homes for approximately 100 families to be settled in the Bishop Indian Tract, near Bishop, Cal.

REINFORCING STEEL

... Awards of 7050 tons; 8250 tons in new projects

AWARDS

ATLANTIC STATES

- 2000 Tons, Ocean City, Md., Sinepuxent Bay bridge, divided between Bethlehem Steel Co., Bethlehem, Pa., and Dow-Weld Co., Inc.
- 1200 Tons, Syracuse, N. Y., Delaware, Lackawanna & Western railroad grade elimination, to Bethlehem Steel Co., Bethlehem, Pa., by Elmhurst Contracting Co.
- 150 Tons, New York, substructure, Eastchester Creek bridge, to Bethlehem Steel Co., Bethlehem, Pa., by Northeastern Const. Co.
- 125 Tons, New York, Hutchinson River Parkway (H-3), to Bethlehem Steel Co., Bethlehem, Pa., by National Excavating Corp.
- 100 Tons, Wellesley, Mass., apartment house, to Concrete Steel Co., Boston.

CENTRAL STATES

- 740 Tons, Piedmont, Mo., reservoir, to Laclede Steel Co., St. Louis.
- 450 Tons, Indianapolis, Vannegut Hardware Co., building, to Laclede Steel Co., St. Louis.
- 125 Tons, Chicago, South Wabash Avenue garage, to Cece Steel Products Corp., Omaha.
- 105 Tons, Sandoval, Ill., public school, to Laclede Steel Co., St. Louis.
- 100 Tons, Sioux City, Iowa, flood protection work, to Sheffield Steel Corp., Kansas City.
- 100 Tons, Michigan City, Ind., breakwater, to Olney J. Dean Steel Co., Chicago.
- 100 Tons, Springfield, Ohio, joists for F. W. Woolworth store, to Truscon Steel Co., Youngstown (previously erroneously reported).

WESTERN STATES

- 500 Tons, Vancouver, Wash., Aluminum Co. of America plant, to Mercer Steel Co., Portland, Ore.
- 450 Tons, Sacramento, Cal., redeck Yolo Causeway, to Kyle & Co., Fresno, Cal., through Lee J. Immel, Berkeley, Cal., contractor.
- 250 Tons, Odair, Wash., Grand Coulee Dam (Invitation B-38246-A), to Bethlehem Steel Co., San Francisco.
- 190 Tons, Kettle Falls, Wash., Kettle Falls bridge piers and approaches, to Bethlehem Steel Co., Seattle, through S. S. Mullen, Inc., Seattle.
- 148 Tons, Newkirk, N. M., Tucumcari project (Invitation 32796-A), to Colorado Fuel & Iron Corp., Denver.
- 105 Tons, Albany, Cal., high school addition, to Truscon Steel Co., San Francisco, through P. Sartorio, San Francisco, contractor.

CANAL ZONE

- 100 Tons, Albrook Field, civilian quarters, to Truscon Steel Co., Cleveland.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

- 2000 Tons, Washington, District of Columbia armory.
- 1500 Tons, Camden, N. J., plant addition, Campbell Soup Co.
- 925 Tons, Jersey City, N. J., Lafayette housing project; bids May 16.
- 700 Tons, Philadelphia, extension to Navy Yard shipways.
- 350 Tons, North Adams, Mass., Boston & Maine R. R. bridge.
- 300 Tons, Green Haven, N. Y., State prison cell blocks.
- 200 Tons, New Haven, Conn., Procurement Division Invitation 3-150-7285; bids taken.
- 100 Tons, Brooklyn, Kings County Hospital building.
- 100 Tons, Auburn, N. Y., prison cell-block; bids May 23.

CENTRAL AND SOUTHWEST

- 550 Tons, Fort Smith, Ark., outlet works for Blue Mountain Dam; bids May 28.
- 460 Tons, Kingsville, Ohio, railroad overpass.
- 230 Tons, Chicago, subway section D-2-B; bids June 6.
- 130 Tons, Chicago, Illinois Bell Telephone Co., Patt Boulevard exchange building.
- 130 Tons, Lawrenceburg, Ind., flood wall, U. S. Engineer.
- 114 Tons, Green Bay, Wis., Prange store.

WESTERN STATES

- 260 Tons, Los Angeles, Sepulveda Dam railroad bridges across Los Angeles River and Bull Creek; bids June 13.

150 Tons, Tongue Point, Ore., barracks, officers quarters, and administration building; Western Construction Co., Seattle, contractor.

100 Tons, Spokane, Wash., remodel and extend post office and courthouse; James Leck Co., Minneapolis, low bidder on general contract.

HAWAII

200 Tons, Hickam Field, T. H. hospital; W. S. Ching, Honolulu, low bidder.

Greece Turns to U. S.

For Machinery

WASHINGTON—Barring unforeseen developments in the Mediterranean and aside from the unfavorable exchange situation, outlook for sale of American industrial machinery in Greece is reported as "promising" in a dispatch to the Commerce Department. The report said that while it is not anticipated that purchases of American equipment this year will reach the 1939 level, indications are that a fair demand will develop because machinery supplies from Germany are becoming increasingly uncertain. In 1939 imports of industrial machinery from the United States were valued at \$700,000, a figure double that for 1938.

U. S. to Open Bids on Chromium Ore May 24

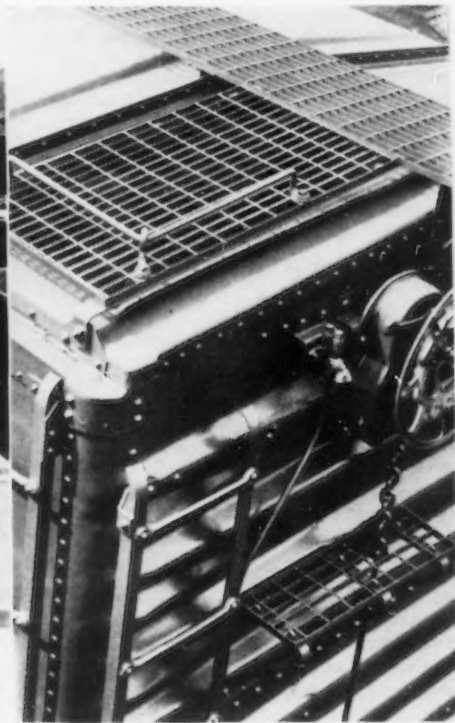
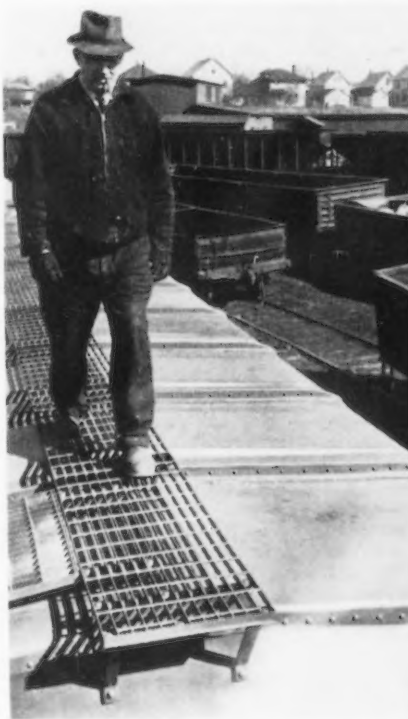
WASHINGTON—The Treasury Department's Procurement Division will open bids on May 24 for 17,500 tons of chromium ore under the strategic and critical war material purchasing program. The bid invitations specify ore of 48 per cent chrome content to be delivered to the Army General Depot, New Cumberland, Pa., with from 1000 to 5000 tons for delivery at Ogden, Utah.

Monarch Machine Tool Votes Plant Addition

CLEVELAND—Directors of Monarch Machine Tool Co., Sidney, Ohio, have authorized a 20,000 sq. ft. addition to the plant which will add approximately 15 per cent to present capacity.

"The extension (the sixth in six years) has been found necessary to house approximately \$200,000 of new production equipment ordered since the first of the year," Wendell E. Whipp, president of the company, said.

Steel Grating for Freight Car Catwalks



THIS photograph shows the first freight cars equipped with the new open-mesh steel running boards and brake steps developed by Blaw-Knox Co., Pittsburgh. An adaptation of the company's electroforged grating, the new design has serrated bearing bars to improve its non-skid qualities. Its one-piece construction is said to provide rigidity and freedom from rattling. Reduced corrosion and wear are likewise claimed to result from the absence of bolted joints.

THIS WEEK'S MACHINE ... TOOL ACTIVITIES ...

... Orders continue at high level and further machine tool plant expansion is being considered, largely to meet aircraft demand ... Fall deliveries being quoted generally, with many machines not available until well into 1941 ... Ordnance department places educational orders.

Plans for Production Increase Being Discussed

CINCINNATI—While there has been no immediate affect of the increased war activity in Europe, manufacturers of machinery in this area anticipate an increase of pressure for tools generally. Currently, there has been no change in the continued steady flow of new business both from domestic and the foreign sources. In some sources, the domestic demand tends to outweigh export business, but on the market average, the relationship is about equal. Reports of increased airplane activity in the very near future has caused several manufacturers to consider plans for increased production in their various plants. Of course, operations continue to be handicapped to a certain degree by the lack of adequate skilled labor. Apprentice training in some plants is being speeded up, while others are seeking to train men for specific machine jobs. The delivery situation does not seem to ease at all. Virtually no shipments are possible until late in the third quarter, with a great majority of promises extending into the fourth quarter and in many instances well into 1941. No change is noted in the relative position of the various types of tools, with lathes, millers and grinders still in the lead, but other tools are adequately represented.

Local Market Spotty At Cleveland

CLEVELAND—Reports from dealers indicate that during the past week the market here has become more spotty than experienced earlier this spring. The situation could change very quickly, however. The amount of business which has been quoted and is pending remains very large. Certain manufacturing companies are going right ahead with plant expansions which presumably will require equipment.

Deliveries on new machines are just as far extended as ever. Frequently the shipment question is the biggest problem involved in closing orders. In some cases involving outstanding quotations, the prospective buyers will be forced to act quickly before production schedules are made up or face the prospect of waiting even longer for deliveries.

Testifying to the strong demand for used machinery, one company sold 33 machines from April 15 to May 10, including two horizontal boring mills. Most of the equipment is being shipped to the British and French.

Midwestern Firms Get Ordnance Educational Orders

CHICAGO—Some business in this district is still being held up because of the Illinois retailers' occupational tax of 3 per cent which is being added to the price of all machine tools sold in this State whether they are shipped from inside or outside of Illinois. As soon as more customers become aware of the State Finance Department's recent ruling that even direct sales to an Illinois buyer from an out-of-state manufacturer will be subject to the tax, business should soon resume its normal course. New orders since the first of May have been coming in at a very satisfactory rate and the volume of inquiries appears to be holding to its previous level. Deliveries are no better except in a few isolated cases such as radial drills, and vertical boring mills. Lathes, planers, milling machines and other equipment for which there has been a strong export demand, are still booked far ahead.

Several large educational orders have been placed with plants in this district by the Army Ordnance Department recently. One of these was given to the Elgin National Watch Co., Elgin, Ill., and is for the production of a mechanical time fuse for anti-aircraft shells. This fuse is also manufactured at Frankfort Arsenal in Philadelphia and the Elgin company is understood to be duplicating the arsenal's equipment in most respects. The entire order is estimated to total around \$450,000, and it will probably be a year before satisfactory production is underway. The Minneapolis-Moline Power Implement Co. has been given a large order for the machining of a 155-mm. shell and an entire new production line, including lathes, presses for nosing in the nose of the projectile, a banding press and furnaces for heating the nose of the shell, will have to be installed in the Minneapolis plant. Here again it will probably be nearly a year before this plant will be in production on this shell. The Hurley Machine Co. of Chicago, known for its washing machines, has been given an Ordnance Department order for the manufacturer of fuse boosters for the 155-mm. shells being machined in Minneapolis. Some automatic screw machinery will probably be necessary for this work. The 1941 appropriation for the Rock Island arsenal and for the Ordnance Department will not be available until July 1 which marks the beginning of the fiscal year. On the basis of current war news from Europe it is entirely likely that a considerable increase in the amount heretofore expended for this purpose will be seen.

Detroit Tool and Die Shops Loaded to Capacity

DETROIT—Indications that the flood of tool and die work for local manufacturers and outside concerns has exceeded Detroit's job shop capacity have been encountered frequently in recent weeks. One instance is in the reported search of one fabricator for a die shop to make up several sets of dies for automobile window garnish moldings. This fabricator is understood to be a concern which previously has not turned out this kind of product, and it is having more than the usual amount of difficulty to find a die shop to take on the job because die time has been pretty well sold out for months to come.

Plant additions by Vickers, Inc., manufacturer of hydraulic pumps, valves and presses, and by the Bopp Steel Co. are two more in the Detroit area which will result in the purchase of new tools and equipment. Chrysler is still buying for the transmission plant which is being erected at Highland Park. Machinery Suppliers, Inc., continues to be a very important buying factor, with its purchase of equipment for manufacture of aircraft equipment for the Allies. Buick, aiming to complete its new axle plant and sheet metal plant by June, is reported ready to award contracts for the construction of a conveyor system more than 3000 ft. long to carry finished axles from the new axle building to a distributing point near the final assembly plant. A total of 21 different conveyor systems will be required for the axle plant.

Sales Continue at High Level in the East

NEW YORK—All dealers reported an active volume of sales in the past week, although for some sellers this volume was 80 per cent a result of war activity, mostly aircraft. Heavy commitments are still being made by local engine and parts plants, following recent large purchases of planes and engines by the Anglo-French Purchasing Commission. No new shell work is reported in this area, although practically every manufacturer of heavy duty industrial equipment is figuring on such contracts and lining up equipment. Bids are also being taken for equipment to be used in connection with possible educational orders for the U. S. Ordnance Department. There has been some scattered buying of machine tools for strictly peacetime work, such as locomotive building, and inquiries continue in good volume from many sources. Little if any improvement is seen in the delivery situation despite the fact that the machine tool industry has more than doubled its capacity since last September.

Machine Tool Activity Holds at 93.4%

CLEVELAND—April operating activity of the machine tool industry remained at 93.4 per cent of capacity, the same rate as for March, 1940, according to the latest report of the National Machine Tool Builders' Association here.

Current Metal Working Activity

Latest Data Assembled by THE IRON AGE from Recognized Sources

	April 1940	March 1940	February 1940	February 1939	2 Months 1940	2 Months 1939
Steel Ingots: (net tons)						
Monthly output ^a		4,236,050	4,374,625	3,347,288	9,994,323	6,902,562
Average weekly output ^a		956,219	1,056,673	836,922	1,166,198	818,809
Per cent of capacity ^a		63.0	69.62	56.30	76.83	53.54
Pig Iron: (net tons)						
Monthly output ^b		3,270,499	3,311,480	2,307,409	7,343,502	4,743,883
Raw Materials: (gross tons)						
Coke output ^c (net tons)		4,259,848	4,172,042	3,148,754	9,117,410	6,593,010
Lake ore consumed ^d		4,087,767	4,241,839	2,852,540	9,531,147	5,779,246
Scrap iron and steel consumed ^e		2,932,000	3,054,000	2,313,000	6,829,000	4,808,000
Castings: (net tons)						
Malleable, orders ^f		35,730	34,901	33,234	75,339	71,339
Steel, orders ^f			40,913	31,223	84,034	74,195
Finished Steel: (net tons)						
Trackwork shipments ^a		8,446	6,898	4,250	13,660	7,159
Fabricated shape orders ^f		127,731	92,526	82,719	171,355	184,431
Fabricated plate orders ^f		35,435	25,824	22,903	59,628	43,414
U. S. Steel Corp. shipments ^g		931,905	1,009,256	747,427	2,154,848	1,618,293
Fabricated Products:						
Automobile production ^h		439,911	421,820	317,520	871,134	674,482
Steel furniture shipments ^a		6,951,902	\$2,263,969	\$1,748,184	\$4,527,602	\$3,530,975
Steel boiler orders ^o (sq. ft.)		760,668	558,108	817,347	1,083,400	1,947,959
Locomotives ordered ^l		40	18	3	46	11
Freight cars ordered ^l		1,076	1,172	2,004	1,381	2,007
Machine tool index ^j		93.4	92.9	56.1	93.1	54.3
Foundry equipment index ^k		243.4	179.4	135.3	180.9†	133.3†
Non-Ferrous Metals: (net tons, U. S. only)						
Lead shipments ^l		46,353	39,176	30,135	79,051	65,058
Lead stocks ^l		74,692	72,658	138,134		
Zinc shipments ^m		51,095	53,048	45,291	161,694	127,758
Zinc stocks ^m		73,611	67,086	127,985		
Tin deliveries ⁿ (gross tons)	7,855	9,244	6,600	4,105	16,380	8,435
Refined copper deliveries ^o		71,893	72,809	51,577	177,354	*
Refined copper stocks ^o		159,795	145,393	309,119		
Exports: (gross tons)						
Total iron and steel ^p			671,301	359,690	1,254,822	722,362
All rolled and finished steel ^p			315,263	110,766	608,619	218,318
Semi-finished steel ^p			84,876	14,472	163,508	29,914
Scrap ^p			232,800	222,704	418,453	448,138
Imports: (gross tons)						
Total iron and steel ^p			6,740	19,149	15,014	46,813
Pig iron ^p			2,032	603	3,946	1,189
All rolled and finished steel ^p			1,921	10,149	3,685	28,764

† Three months' average. * Not available. †† Preliminary.

Source of data: ^a American Iron and Steel Institute; ^b THE IRON AGE; ^c Bureau of Mines; ^d Lake Superior Iron Ore Association; ^e Bureau of the Census; ^f American Institute of Steel Construction; ^g United States Steel Corp.; ^h Preliminary figures from Ward's Automotive Reports—Final figures from Bureau of the Census, U. S. and Canada; ⁱ Railway Age; ^j Foundry Equipment Manufacturers Association; ^k American Bureau of Metal Statistics; ^l American Zinc Institute; ^m New York Commodity Exchange; ⁿ Copper Institute; ^o Department of Commerce; ^p Institute of Scrap Iron and Steel.

Cost of Cutting

(CONCLUDED FROM PAGE 43)

could be offered on this subject. There is a temptation to analyze many of the other figures appearing in Table II reflecting the test results, but at least it might be questioned as to why, on the $\frac{3}{4}$ in. metal, a No. 1 tip was used for butane, No. 5 for propane and No. 3 for acetylene, and then the three tips were compared in gas consumption and cutting efficiency. Interestingly enough, with butane the No. 1 tip, when cutting $\frac{3}{4}$ in. metal consumed precisely the same number of cubic feet of fuel gas and oxygen per hour as it did in cutting $\frac{3}{16}$ -in. metal. For propane, which ordinarily would give quite similar results to butane, (atmospheric temperature being adequate for propane pressure requirements) the fuel gas consumption was nearly six times as large and the hourly oxygen consumption jumped to 203.5 cu. ft. The same No. 5 tip was later on used in cutting $\frac{1}{4}$ -in. plate with propane and, amazingly, the fuel gas consumption dropped from 6.10 cu. ft. to 1.21 cu. ft., and the oxygen consumption dropped to 178 cu. ft. In the determination of fuel gas costs, the acetylene cost of 1.25c. per cu. ft. must have been predicated upon acetylene gen-

erator gas and not on cylinder gas, and the per cubic foot cost of the butane and propane might have involved expenses beyond the actual cost per gallon.

Perhaps this ought to suffice, since there is hardly a figure given in the cost comparison table which does not suggest similar questions.

The point of this analysis is to urge greater test accuracy and certainly a more complete understanding of the subject matter, since questionable data can do much harm and certainly will not contribute toward the solution of a problem.

In the average shop, where both torch welding and cutting processes are employed, the question of fuel gas selection rarely comes up. In the shops where cutting operations are of primary importance, the selection of the fuel gas depends not merely upon relative gas consumption but principally upon the type of cutting, cylinder transportation cost, cylinder handling charges, etc. A complete analysis of these contributory factors would involve infinitely more space than is justified.

Michigan Molded Plastics Organized in Michigan

DEXTER, Mich.—Michigan Molded Plastics, Inc., has been formed here and will begin operating its new plant within the month. John Rossiter, formerly of Reynolds Spring Co., Lawrence Seybold, formerly works manager of the plastics division of Reynolds Spring, and James Libby, connected with Garrity Mfg. Co. at Adrian, Mich., will operate the new concern.

Bill Provides \$60,000,000 For Hospital Construction

WASHINGTON—A proposed \$60,000,000 program for hospital construction during the next six years has been reported favorably to the Senate by the Committee on Education and Labor. Identified as the "National Hospital Act of 1940," the measure is expected to be the only phase of a public works program to be

acted upon favorably at this session of Congress.

Introduced by Senator Robert F. Wagner, the bill is understood to have administration backing. It would empower the Federal Works Agency to spend \$10,000,000 for hospital construction during the fiscal year ending June 30, 1941.

NLRB Upholds CIO Claims On International Harvester

CHICAGO—A NLRB trial examiner recommended early last week that the International Harvester Co. withdraw all recognition from company unions in plants at Rock Falls, Rock Island, East Moline and Chicago, Ill., and Milwaukee. The examiners' report stated that the company "dominated and interfered with the formation and administration of" the unions. A CIO Unit had filed charges against the company.

TRADE NOTES

Northern Equipment Co., Erie, Pa., manufacturer of the Copes system of boiler feed control, has appointed Meleney Engineering Co., 709 Mills Building, Washington, as district representative for its products.

Manufacturing and office space has been leased at 47-28 37th Street, Long Island City, N. Y., by Thomas C. Wilson, Inc., manufacturer of tube and pipe cleaning equipment, formerly of 55 Vandam Street, New York. Additional machine tools, including another large turret lathe and an additional universal milling machine have been installed.

Century Steel Corp., distributor of steel, copper and brass sheets and strip, has moved its warehouse to 630 West 41st Street, Chicago, according to D. L. Friedman, sales manager.

SKF Steels, Inc., 369 Lexington Avenue, New York, announces sale of its retail tool steel business to Uddeholm Co. of America, Inc., 155 East 44th Street, New York, effective May 1. Distributors of the latter company are Ackerlind Steel Co., Inc., Austin-Hastings Co., Inc., Jamison Steel Corp., and Peninsular Steel Co.

New England Trawler Equipment Co., Boston, announces a change in its location to the plant of the New England Structural Products Co., Eastern Avenue, Chelsea, Mass.

The Kagel Brass Foundry Co., Milwaukee, has been organized to manufacture metal castings and other foundry products, the organizers being L. Kagel, F. W. Behling and E. Lecher. Auer Steel & Furnace Co., Milwaukee, has been formed to deal in sheet metal and building products. E. J. Radmer, D. C. Curtes and H. W. Gohlke are organizers.

FINANCIAL NOTES

Truscon Steel Co. reports net loss of \$11,527 for the first quarter, after deductions for repairs, maintenance, and provision for depreciation, compared with a net profit of \$29,418 in the first quarter of 1939.

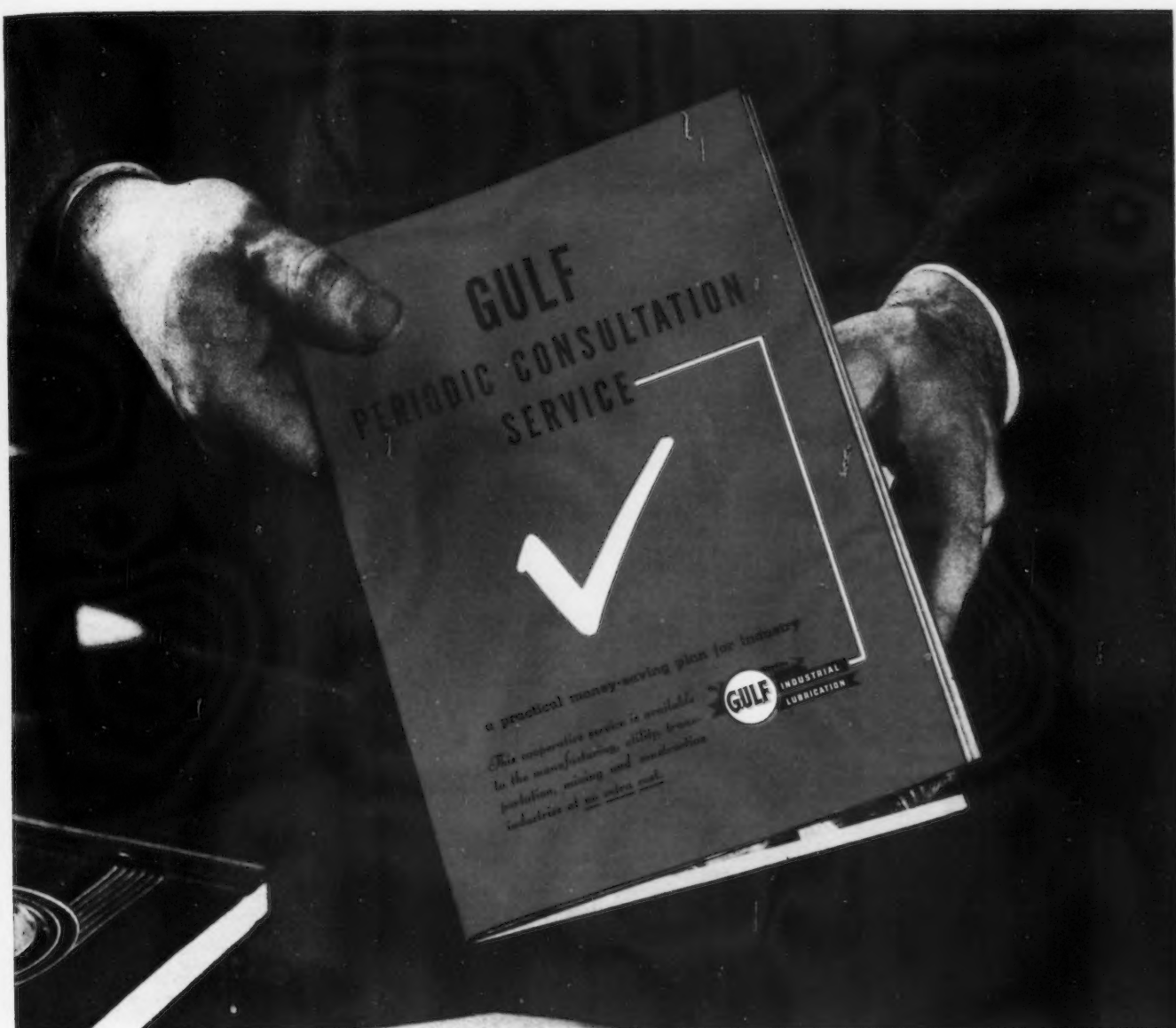
Otis Steel Co., Cleveland, reports net loss of \$165,513 in the quarter ended March 31, 1940, after allowing \$276,000 for depreciation, compared with net profit before Federal tax of \$228,804 in the quarter ending March 31, 1939, after allowing the same amount for depreciation.

Cleveland Cliffs Iron Co., Cleveland, reports for the three months ended March 31, 1940, net loss of \$57,953 compared with net loss of \$128,795 in the corresponding 1939 quarter.

National Acme Co., Cleveland, reports first quarter net profit of \$515,546 after all charges, compared with profit of \$53,836 in the first quarter of 1939.

Pittsburgh Coke & Iron Co., Pittsburgh, and subsidiaries report for the quarter ended March 31, net profit of \$185,206, equal, after preferred dividends, to 24c. a common share, compared with \$94,026 or 11c. a share in the corresponding 1939 quarter.

Independent Pneumatic Tool Co., Chicago, reported net income for 1939 of \$938,121 as compared with \$288,047 in 1938.



The "Booklet-of-the-Month"

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HERE is news for cost-conscious executives who are harassed by higher "non-controllables." With costs up and profits in the squeeze, operating men are welcoming this practical plan which they can put to work *immediately* to reduce the "controllables."

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ciency of your production and the cost of maintaining your equipment. *Now* you can use this modern method to establish a scientific lubrication procedure which will insure higher efficiency and lower costs for the maintenance and operation of your machinery.

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ufacturing efficiency and profits, here is a *practical* plan through which *immediate action* can be taken! Write for your free copy of the booklet which explains this money-saving service to you.



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PLANT EXPANSION AND EQUIPMENT BUYING

◀ NORTH ATLANTIC ▶

American Can Co., 230 Park Avenue, New York, has let general contract to Turner Construction Co., 420 Lexington Avenue, for one-story and basement addition, 140 x 280 ft., to branch plant on Dey Street, Jersey City, N. J., where company recently purchased two-story structure for expansion. Cost over \$200,000 with equipment.

Calvert Distillers Corp., 405 Lexington Avenue, New York, has asked bids on general contract for four-story addition to branch plant at Relay, Md., for storage and distribution. Cost close to \$85,000 with equipment. Smith, Hinchman & Grylls, Inc., Marquette Building, Detroit, is architect and engineer.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until May 24 for steel cabinets for blueprints (Circular 651); until May 28 for end mills (Circular 648).

Anaconda Copper Mining Co., 25 Broadway, New York, has authorized expansion and improvements in plant at Anaconda, Mont., including modernization of smelting works and additional equipment, improvements in casting division, installation of hoisting and other handling equipment. New electric hoist will be installed in Leonard shaft, operating from a depth of 5000 ft.; improvements and new equipment at Lexington shaft. Entire project to cost over \$400,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 24 for carbon steel boiler tubes (Schedule 1591) for Brooklyn and Mare Island Navy yards; until May 21, cutters (bits) and lathe tool holders, tungsten-cobalt tool steel (Schedule 1620) for Philadelphia yard.

Erle Bottling Co., 614 Oriskany Street, Utica, N. Y., has approved plans for new two-story mechanical-bottling, storage and distributing plant, 70 x 105 ft. Cost over \$50,000 with equipment. T. H. Williams, 30 Charlotte Street, is architect.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until May 21 for binding post chambers with cable stubs (Circular 445); until June 3, 39,390 to 70,700 ft. of cable, 103,090 ft. of cable, and 2265 to 22,650 ft. of cable, and cable reels (Circular 434), test sets (Circular 435).

Port Quartermaster, New York Port of Embarkation, Brooklyn, asks bids until May 24 for brass, wrought iron and lead pipe, bushings, unions, joints, nipples, plugs, tees, etc. (Circular 626-43).

Quartermaster Supply Officer, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until May 23 for 18 steel oxygen cylinders, 12 steel acetylene gas cylinders, gate and three-way valves, etc. (Circular 626-358).

Andrew Jergens Co., 2535 Spring Grove Avenue, Cincinnati, pharmaceutical products, etc., has let general contract to James Stewart & Co., 230 Park Avenue, New York, for one, two and four-story plant at Belleville, N. J., 200 x 500 ft., with smaller structure. Cost close to \$1,000,000 with equipment. Tietig & Lee, 34 West Sixth Street, and A. M. Kinney, Inc., Carew Tower Building, both Cincinnati, are architects and engineer, respectively.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until May 27 for 30, 25 or 20-unit pelleting presses, Class II, and 20, 15 or 10-unit similar presses, Class I (Circular 1454).

Schmidt & Ault Paper Co., Inc., King's Mill Road, York, Pa., wrapping papers, etc., has let general contract to D. A. Smith, York, for two-story addition for storage and distribution. Cost about \$45,000 with equipment.

Quartermaster Depot, Twenty-first and Johnston Streets, Philadelphia, asks bids until May 21 for one portable air compressor, with two paving breakers and steels (Circular 669-329); until May 28, four warehouse gasoline tractors (Circular 669-328).

United States Engineer Office, Custom House, Philadelphia, asks bids until May 20 for three cast iron back-head stuffing boxes and 12 cast iron eccentrics (Circular 364); until May 21, three cast steel engine spur gears (Circular 365); until May 22, 12 cast steel clutch sleeves, 24 cast steel clutch sleeve collars, and 30 cast steel fulcrum arms for hauling gear (Circular 366).

◀ BUFFALO DISTRICT ▶

Acheson Graphite Corp., Niagara Falls, N. Y., has let general contract to Walter S. Johnson Building Co., 2532 Hyde Park Boulevard, for one-story addition, 50 x 200 ft. Cost close to \$50,000 with equipment.

Buffalo Niagara Electric Corp., Electric Building, Buffalo, has arranged fund of \$3,500,000 for expansion and improvements, including power stations, overhead and underground transmission lines, distributing system, power substations and other structures. New equipment and service building, with shop and repair facilities, will be built on Dewey Avenue, to cost about \$300,000 with equipment.

Harold H. Clapp, Inc., 777 Mount Read Boulevard, Rochester, N. Y., canned food products, has let general contract to Frederick Gleason Co., 108 Colvin Street, for one-story addition for storage and distribution. Cost over \$75,000 with equipment.

◀ NEW ENGLAND ▶

Bridgeport Metal Goods Co., Pine Street, Bridgeport, Conn., steel, brass, aluminum and other metal products, has let general contract to Gallatly Construction Co., 25 Housatonic Avenue, Bridgeport, for one-story addition, 60 x 140 ft. Cost close to \$50,000 with equipment. H. C. Fulton, Bridgeport, is architect.

Commanding Officer, Ordnance Department, Watertown Arsenal, Watertown, Mass., asks bids until May 23, gas-fired furnace (Circular 513), two electric tempering furnaces, carbon alloy or high-speed steels (Circular 514).

Public Works Officer, Navy Yard, Boston, asks bids (no closing date stated) for oil-burning equipment for naval direction finder station, Cape Elizabeth, Me. (Specifications 9742).

Pepsi-Cola Distributing Co., Inc., 1131 Randolph Avenue, Boston, has let general contract to Walter L. Ritchie Co., 7 Davis Square, Somerville, for one-story mechanical-bottling, storage and distributing plant at Methuen, Mass., 100 x 100 ft. Cost close to \$50,000 with equipment. Samuel Glaser, 162 Newbury Street, Boston, is architect.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until May 21 for one double cut-off sawing machine, with gaining attachment (Circular 381), 1400 high-speed steel cutters and 1400 high-speed steel end mills (Circular 383).

Wyman-Wordan Co., 105 Madison Street, Worcester, Mass., is erecting a maintenance die and shear house, and has asked for private bids on a forge shop addition.

◀ SOUTH ATLANTIC ▶

Bureau of Yards and Docks, Navy Department, Washington, asks bids until June 5 for one hand-operated, 8-ton bridge crane for naval air station, Jacksonville, Fla. (Specifications 9805).

Dawson Cotton Oil Co., Dawson, Ga., plans one-story addition for expansion in commercial fertilizer-manufacturing plant to double present capacity. Cost about \$45,000 with equipment.

City Council, Atlanta, Ga., will take bids soon for new municipal incinerator plant. Cost about \$100,000 with equipment. Robert & Co., Bona Allen Building, are engineers.

◀ SOUTH CENTRAL ▶

Frankenmuth-Kentucky Brewing Co., 1445 South Fifteenth Street, Louisville, has let general contract to Hays & Nicoulin, 939

Franklin Street, for two-story and basement addition, 47 x 143 ft., with loading platform length of building, for a mechanical-bottling unit. Installation will include pasteurizing, bottle-crowning, washing and other equipment. Cost about \$250,000 with machinery. Main offices are at Bay City, Mich.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until May 24 for steel gate guides and sill beams for spillway gates at Watts Bar Dam.

City Council, Meridian, Miss., asks bids until May 22 for deep-well pumping machinery and accessories for three new wells for water system; also 200,000-gal. steel reservoir and other waterworks equipment. Rust Engineering Co., Martin Building, Birmingham, is consulting engineer.

Quartermaster Depot, War Department, Washington, asks bids until May 24 for one 40-hp. diesel crawler tractor; three-wheel, 10-ton road roller; three 60-hp. diesel crawler tractors; one gasoline three-drum hoist; two portable, gasoline centrifugal drainage pumps, capacity not less than 7000-gal. per hr.; one 12,000-gal. gasoline storage tank (Circular 950-246) for Mobile, Ala.

◀ WASHINGTON DIST. ▶

Engineer Board, Fort Belvoir, Va., asks bids until May 28 for a traveling crane and hoist, with accessories (Circular 42).

Kents Boat Co., Inc., Chestertown, Md., recently organized, has taken over waterfront property heretofore held by Chester Steamboat Co., including wharf, building, etc., and will remodel for shipyard, boat-building and repair plant. E. S. Gaumer and T. E. Garbutt head company.

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until May 22 for saw blades, chisels, hacksaw frames, thickness gages, hammers, oilers, pliers, punches, steel rules, screwdrivers, drills, grinders, jacks, steel wire cleaning brushes, cross saws, air compressors and other equipment (Circular 398-205).

United States Engineer Office, First and Douglas Streets, N.W., Washington, asks bids until May 22 for design and manufacture of three vertical, motor-driven mine-sinker pumping units and auxiliaries (Circular 318).

Manchester Board & Paper Co., Canal and Hull Streets, Richmond, Va., wrapping papers, paper board products, etc., has let general contract to Allen J. Saville, Inc., Electric Building, for two-story addition to mill on Mayo's Island, for storage and distribution. Cost close to \$40,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, asks bids until May 21 for lighting and power cable, flexible metallic (steel) conduit, conduit bushings, pipe clamps, pipe sleeving, brass terminal tubes, panelboards, switches and other equipment (Schedule 4047).

Chemical Warfare Service, Edgewood Arsenal, Edgewood, Md., asks bids until May 21 for 20, one-ton each, steel chemical containers (Circular 677).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 21 for braces and ratchet drills, breast and hand drills (Schedule 1567), 20,000 ft. armored heat and flame-resistant electric cable (Schedule 1612), band, cross-cut and hand saws (Schedule 1568); until May 24, one or two tractor cranes, diesel drive, crawler-type, with 15-ft. boom and 10,000 lb. hoisting capacity at 6-ft. radius (Schedule 1590), electric drills and grinders (Schedule 1601), steel sockets for Morse taper shank tools (Schedule 1622), steel, tinned cable (Schedule 1595) for Eastern and Western Navy yards; 12-in. gear-cutting machine, planer (Schedule 1657) for Washington yard.

◀ WESTERN PA. DIST. ▶

Sharon Tube Co., North Water Avenue, Sharon, Pa., plans one-story addition. Cost over \$50,000 with equipment.

Duquesne Light Co., 435 Sixth Avenue, Pittsburgh, has approved plans for alterations and improvements in steam-electric generating station on Brunots Island, including additional equipment. Cost close to \$150,000 with equipment.

Pennsylvania Railroad Co., Philadelphia, plans new steel coal tippie at locomotive and car yards at Emporium, Pa. Cost about \$50,000 with machinery.



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Orthosil—the original Pennsalt Cleaner—quickly made an important place for itself in heavy duty metal cleaning throughout industry generally. Companion cleaners, meeting every need with laboratory precision, have been developed for varied and extreme requirements. The entire line is known today as the Pennsalt Cleaners.

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PENNSALT

CLEANERS FOR INDUSTRY

PENNSYLVANIA SALT MANUFACTURING COMPANY

Talon, Inc., Meadville, Pa., metal slide fasteners, has let general contract to George A. Rutherford Co., 2725 Prospect Avenue, Cleveland, for one-story addition to steam power house. Cost over \$40,000 with equipment.

◀ OHIO AND INDIANA ▶

Sterling Foundry Co., Wellington, Ohio, machine tool castings, etc., has let general contract to Austin Co., Cleveland, for two one-story additions. Cost over \$85,000 with equipment.

Contracting Officer, Aircraft Radio Laboratory, Wright Field, Dayton, Ohio, asks bids until June 5 for signal generators, circuit testers, power meters, recorders and other equipment (Circular 15-ARL).

City Auto Stamping Co., Lint Avenue, Toledo, Ohio, has engaged Albert Kahn, Inc., New Center Building, Detroit, architect and engineer, to prepare plans for one-story addition, about 80,000 sq. ft. of floor space, for die department, now occupying leased space. Cost about \$500,000 with equipment.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until May 20 for compression and tension springs (Circular 1492), six fuel pumps (Circular 1499), engine control assemblies (Circular 1495); until May 21, motor-generator set (Circular 1497), 1/2-in. flexible conduit (Circular 1432), 2375 ball bearing rod end assemblies (Circular 1515), 200 fuel mixing indicator connection assemblies (Circular 1502); until May 22, cable clamps and cable clamp assemblies (Circular 1506), engine exhaust collector and engine exhaust mount assemblies (Circular 1517), 18 electric valve seat grinders, 72 grinding wheel holders, dressing tools, etc. (Circular 1518); until May 23, about 42,500 ft. of steel tape armored cable (Circular 1520), 10 sump tanks, filters, regulator, relief and check valves, etc. (Circular 1524).

Globe Valve Co., Delphi, Ind., plans one-story addition, 50 x 160 ft., for expansion in machine shop. Cost about \$45,000 with equipment.

Board of School Trustees, Vincennes, Ind., plans one-story and basement vocational shop at high school, 52 x 80 ft. Lester W. Routt, Citizens' Trust Building, is architect.

Mansfield Metal Vault Co., Longview Avenue, Mansfield, Ohio, will add 13,000 sq. ft. of floor space to its manufacturing and display facilities, erection to start soon. Elmer Hedeen is president and manager.

◀ MICHIGAN DISTRICT ▶

Chrysler Corp., 341 Massachusetts Avenue, Detroit, plans one-story addition to plant on Oakland Avenue, Highland Park, 400 x 1000 ft. Cost over \$850,000 with equipment. Albert Kahn, Inc., New Center Building, is architect and engineer.

Deere & Co., Moline, Ill., agricultural implements and equipment, have asked bids on general contract for four-story addition to branch plant at Lansing, Mich., operated in name of John Deere Plow Co. Cost over \$100,000 with equipment. O. A. Eckerman, Moline, is architect.

A.C. Spark Plug Division, General Motors Corp., Flint, Mich., has let contract for superstructure to Darin & Armstrong, Inc., 2041 Fenkel Street, for one, two and four-story plant, about 156,000 sq. ft. of floor space, on which work is under way. Cost about \$1,500,000 with equipment. New structure will replace present plant, which will be vacated on completion.

◀ SOUTHWEST ▶

James R. Kearney Corp., 4236 Clayton Avenue, St. Louis, pole line hardware, electrical fittings, etc., has let general contract to H. B. Deal & Co., 1218 Olive Street, for one-story addition, 50 x 125 ft., on Sarpy Avenue, for storage and distribution. Cost about \$45,000 with equipment.

Lord Grain Co., East Fifth Street, Emporia, Kan., has asked bids on general contract for two-story addition for soy bean processing plant, with steel tanks and other facilities. Cost close to \$40,000 with equipment.

Chapman Sales & Mfg. Co., 504 South Broadway, St. Louis, service cutlery, etc., has acquired property at Lawton and North Ewing Avenues for new one-story plant, for which

plans will be drawn soon. Cost close to \$50,000 with equipment.

Rains Coal Co., Midland, Ark., plans rebuilding 500-ft. coal tippie and boiler house at coal-mining properties near Midland, recently destroyed by fire. Loss about \$40,000 with equipment.

State Board of Public Affairs, State Capital Building, Oklahoma City, Okla., plans several one-story vocational shops at Northeastern Oklahoma junior college.

City Council, Brownfield, Tex., plans extensions and improvements in municipal power plant, including equipment. Bond issue of \$90,000 has been approved.

Magnolia Petroleum Co., Magnolia Building, Dallas, Tex., plans expansion and improvements in oil refinery at Fort Worth, Tex., including additional equipment. Cost over \$100,000 with equipment.

City Council, Edna, Tex., plans new municipal power plant, to use diesel generator units and accessories. Cost about \$150,000 with equipment. Bond issue in that amount will be voted May 18.

◀ MIDDLE WEST ▶

Protex Metal Weatherstrip Co., 2308 West Sixty-ninth Street, Chicago, has let general contract to City Wide Builders, Inc., 3602 West Grand Avenue, for new one-story and basement plant at 4508 South Western Avenue. Cost about \$45,000 with equipment.

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until May 24 for switchboard cable and four reels (Circular 273); until May 26, jack mountings, terminal strips, relay racks, connectors and other equipment (Circular 265).

Bunge Elevator Corp., 310 Fourth Avenue South, Minneapolis, has asked bids on general contract for new 500,000 bu. grain elevator on Thirteenth Avenue, S.E. Cost about \$300,000 with elevating, conveying, screening and other equipment.

Purchasing and Contracting Officer, Quartermaster Office, Lowry Field, Denver, asks bids until June 3 for one iron frame stacker-type truck and two dolly trucks (Circular 117-30).

Great Western Sugar Co., Loveland, Colo., plans rebuilding part of engine house recently destroyed by fire. Loss over \$100,000 with equipment.

Automatic Electric Mfg. Co., 720 South Front Street, Mankato, Minn., electrical equipment and parts, has let general contract to A. R. Kleinschmidt Construction Co., 1026 Carney Avenue, for new one-story and basement plant at Byron and State Streets, for production of time switches, flashers and other specialties. Cost about \$45,000 with equipment.

United States Engineer Office, Post Office Building, Chicago, asks bids until May 24 for one diesel engine-generator set (Circular 132).

Five Point Bakers, Inc., 1405 Seventh Avenue, Moline, Ill., has let general contract to Stoehr & Palmagren Co., 2129 Sixteenth Street, for one-story and basement baking plant, 90 x 95 ft. Cost about \$45,000 with traveling oven, conveyors and other equipment.

◀ PACIFIC COAST ▶

Fluor Corp., 909 East Fifty-ninth Street, Los Angeles, water cooling towers and equipment, has let general contract to Escherich Brothers, 234 West Thirty-seventh Place, for new plant at 2500 South Atlantic Boulevard, consisting of main shop, 80 x 200 ft., pattern shop, 40 x 80 ft., storage and distributing building, 40 x 80 ft., office and operating building, 36 x 290 ft., all one-story. Cost close to \$100,000 with equipment.

Administrator, Bonneville Project, Department of Interior, 811 N.E. Oregon Street, Portland, asks bids until May 24 for insulated wire and cable (Circular 1002).

Consolidated Freightways, Inc., 2029 N.W. Quimby Street, Portland, Ore., has let general contract to Ertz-Burns Co., Pittock Block, for one-story plant, 50 x 100 ft., on Raleigh Street, N.W., for production of motor truck bodies, including parts manufacture and assembling. Cost about \$40,000 with equipment. Charles W. Ertz, Pittock Block, is architect.

Acme Breweries, Inc., 762 Fulton Street, San Francisco, plans five-story and basement

addition for new mechanical-bottling works, with portion for storage and distribution. Cost over \$375,000 with equipment. Bids will be asked on general contract during summer.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until June 5 for four large storehouses at Fleet Supply Base, Oakland, Cal. (Specifications 9795).

Brown Aircraft Corp., Oxnard, Cal., recently organized, care of Durley & Downs, Oxnard, attorneys and representatives, plans one-story plant near Oxnard for airplane production, with parts and assembling divisions. Cost over \$60,000 with equipment. Laurence W. Brown is president.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until May 21 for electric cable (Schedule 1676); until May 24 electric cable (Schedule 1600), about 30,000 ft. of copper-nickel alloy tubing (Schedule 1621), 30-in. bandsaw, with motor, control and wrenches (Schedule 1646); until May 31, six motor-driven paste mixers (Schedule 1647) for Mare Island Navy Yard; until May 24, motor-driven milling machine (Schedule 1578) for San Diego Naval Air Station.

◀ CANADA ▶

Canadian Westinghouse Co., Ltd., 286 Sanford Avenue North, Hamilton, Ont., has awarded structural steel contract to McGregor & McIntyre Iron Works, Ltd., 1139 Shaw Street, Toronto, and several sub-trades for plant addition at Hamilton, Ont. Pigott Construction Co., Ltd., 36 James Street North, is general contractor.

Broulan Porcupine Mines, Ltd., 372 Bay Street, Toronto, will start work at once on 300 ton mill at Porcupine, Ont., to cost about \$250,000. General Engineering Co. of Canada, Ltd., 100 Adelaide Street West, Toronto, is engineer.

Standard Steel Construction Co., Ltd., Port Robinson, Ont., F. L. Haviland, manager, plans erection of an electric steel plant for production of alloys, castings, etc.

W. M. Cornell, manager, Public Utilities Commission, Queen Street East, Sault Ste. Marie, Ont., is receiving bids for \$40,000 substation at Wellington and Church Streets.

Powell Rouyn Gold Mines, Ltd., Confederation Life Building, 12 Queen Street East, Toronto, is having plans prepared by J. C. Rogers for plant to cost \$260,000.

Bathurst Power & Paper Co., Ltd., Bathurst, N. B., will spend \$100,000 on addition and improvements.

Dufferin Shipbuilding Co., recently formed to build mine-sweepers for Canadian Government, has received orders valued at \$2,300,000 and has taken over old Dominion Shipbuilding Co., Dufferin Paving & Crushed Stone, Ltd., and plant of the Hamilton Bridge Co., foot of Bathurst Street, Toronto. Improvements are under way and operations will begin soon.

Defence Industries, Ltd., 625 Dorchester Street, Montreal, will start work at once on \$100,000 plant at Brownsburg, Que.

Bloedel, Stewart & Welsh, Ltd., 510 Hastings Street, Vancouver, B. C., has appointed Howard Simmons, Chicago, engineer, for erection of pulp plant at Port Alberni, B. C., to cost \$3,500,000.

◀ FOREIGN ▶

Reichhold Chemicals, Inc. (Australia) Pty. Ltd., Sydney, Australia, recently organized with capital of \$500,000, is erecting new plant for production of synthetic resin and kindred products. Cost over \$150,000 with equipment. Company is affiliated with Reichhold Chemicals, Inc., 601 Woodward Heights, Ferndale, Detroit, which will furnish technical aid for plant production.

Sorocabana Railway System, Sao Paulo, Brazil, will award contracts soon for electrification of large part of line, to include power transmission and feeder lines, power substations, switching stations and other facilities. Also will purchase rolling stock and modernize certain present rolling stock for electric operation. Cost in excess of \$6,500,000.

Ministry of National Defense, Government of Mexico, Mexico, D. F., plans new military airport at Balbuena, a suburb of Mexico City, to include steel hangars, repair and reconditioning shops, fuel tanks, distribution system, and other facilities. Cost over \$500,000.